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SELECTED WATER RESOURCES ABSTRACTS

VOLUME 9, NUMBER 2
JANUARY 15, 1976

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(Rev. Nov. 1975)

SELECTED
WATER RESOURCES ABSTRACTS

A Semimonthly Publication of the Water Resources Scientific Information Center,
Office of Water Research and Technology, U.S. Department of the Interior

VOLUME 9, NUMBER 2
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W76-00501 -- W76-01000

The Secretary of the U. S. Department of the Interior has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Department. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through August 31, 1978.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

FOREWORD

Selected Water Resources Abstracts, a semimonthly journal, includes abstracts of current and earlier pertinent monographs, journal articles, reports, and other publication formats. The contents of these documents cover the water-related aspects of the life, physical, and social sciences as well as related engineering and legal aspects of the characteristics, conservation, control, use, or management of water. Each abstract includes a full bibliographical citation and a set of descriptors or identifiers which are listed in the **Water Resources Thesaurus.** Each abstract entry is classified in to ten fields and sixty groups similar to the water resources research categories established by the Committee on Water Resources Research of the Federal Council for Science and Technology.

WRSIC IS NOT PRESENTLY IN A POSITION TO PROVIDE COPIES OF DOCUMENTS ABSTRACTED IN THIS JOURNAL. Sufficient bibliographic information is given to enable readers to order the desired documents from local libraries or other sources.

Selected Water Resources Abstracts is designed to serve the scientific and technical information needs of scientists, engineers, and managers as one of several planned services of the Water Resources Scientific Information Center (WRSIC). The Center was established by the Secretary of the Interior and has been designated by the Federal Council for Science and Technology to serve the water resources community by improving the communication of water-related research results. The Center is pursuing this objective by coordinating and supplementing the existing scientific and technical information activities associated with active research and investigation program in water resources.

To provide WRSIC with input, selected organizations with active water resources research programs are supported as "centers of competence" responsible for selecting, abstracting, and indexing from the current and earlier pertinent literature in specified subject areas.

Additional "centers of competence" have been established in cooperation with the Environmental Protection Agency. A directory of the Centers appears on inside back cover.

Supplementary documentation is being secured from established discipline-oriented abstracting and indexing services. Currently an arrangement is in effect whereby the BioScience Information Service of Biological Abstracts supplies WRSIC with relevant references from the several subject areas of interest to our users. In addition to Biological Abstracts, references are acquired from Bioresearch Index which are without abstracts and therefore also appear abstractless in SWRA. Similar arrangements with other producers of abstracts are contemplated as planned augmentation of the information base.

The input from these Centers, and from the 51 Water Resources Research Institutes administered under the Water Resources Research Act of 1964, as well as input from the grantees and contractors of the Office of Water Research and Technology and other Federal water resource agencies with which the

Center has agreements becomes the information base from which this journal is, and other information services will be, derived; these services include bibliographies, specialized indexes, literature searches, and state-of-the-art reviews.

Comments and suggestions concerning the contents and arrangements of this bulletin are welcome.

Water Resources Scientific Information Center
Office of Water Research and Technology
U.S. Department of the Interior
Washington, D. C. 20240

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01 NATURE OF WATER
Includes the following Groups: Properties; Aqueous Solutions and Suspensions

02 WATER CYCLE
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03 WATER SUPPLY AUGMENTATION AND CONSERVATION
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ABSTRACT SOURCES

SELECTED WATER RESOURCES ABSTRACTS

2. WATER CYCLE

2A. General

HYDROLOGY FOR ENGINEERS AND PLANNERS,
Missouri Univ., Columbia. Dept. of Civil Engineering.
A. T. Hjelmfelt, Jr., and J. J. Cassidy.
Iowa State University Press, Ames, 1975. 210 p.

Descriptors: *Hydrology, *Engineering, *Hydrologic aspects, *Analytical techniques, Hydrograph analysis, Hydrologic cycle, Hydrologic data, Hydrographs, Unit hydrographs, Base flow, Groundwater, Flood routing, Infiltration, Evaporation, Precipitation(Atmospheric), Meteorology, Probable maximum precipitation, Statistical methods, Streamflow, Recession curves, Discharge(Water), Reservoir yield, Groundwater movement, Darcys law, Water wells.

Civil engineers design bridges, flood control structures, dams, spillways, street and highway drainage structures, channels, and water supply systems. All of these projects require quantitative hydrologic analysis and the judicious choice of design events. This one semester course text book for undergraduates in hydrology provides tools for choosing design flow on the basis of combined hydrologic, hydraulic, and economic analysis. Chapter headings are Scope of Hydrology, Statistical Methods in Hydrology, Application of Probability and Statistics to Selection of A Design Discharge, Precipitation, Infiltration, Streamflow, Flood Routing, Reservoir Yield, Groundwater, and Evaporation. Emphasis throughout the text is on the application of hydrologic principles and not upon the collection of hydrologic data. (Humphreys-ISWS)
W76-00531

BIBLIOGRAPHY OF HYDROLOGY, CANADA, 1971-1973.
International Association of Hydrological Sciences, Ottawa (Ontario).
For primary bibliographic entry see Field 10C.
W76-00532

HYDROLOGY AND WATER RESOURCES, A SYLLABUS OF REFERENCES FOR TEACHING INTRODUCTORY COURSES IN THE WATER ENVIRONMENT.
National Committee for the International Hydrological Decade, Washington, D.C.
For primary bibliographic entry see Field 10C.
W76-00536

HYDROGRAPH RECESSION CONSTANTS FOR NEW SOUTH WALES STREAMS,
Department of the Environment and Conservation, Canberra (Australia).
For primary bibliographic entry see Field 2E.
W76-00541

THE MEDITERRANEAN OUTFLOW--A SIMPLE ADVECTION-DIFFUSION MODEL,
Rhode Island Univ., Kingston. Graduate School of Oceanography.
For primary bibliographic entry see Field 2L.
W76-00544

THE ASSESSMENT OF REGIONAL GROUNDWATER SCHEMES BY RIVER-FLOW REGRESSION EQUATIONS,
Department of the Environment, Reading (England). Central Water Planning Unit.
For primary bibliographic entry see Field 4B.
W76-00548

HYDROGRAPH RESPONSES TO WATERSHED MODEL SIZE AND SIMILITUDE RELATIONS,
State Univ. of New York at Syracuse. Coll. of Environmental Science and Forestry.
P. E. Black, and J. W. Cronn, Jr.
Journal of Hydrology, Vol 26, No 3/4, p 255-266, August 1975. 4 fig, 4 tab, 28 ref.

Descriptors: *Hydrographs, *Model studies, *Laboratory tests, *Drainage area, *Rainfall simulators, Time of concentration, Peak discharge, Unit hydrographs, Recession curves, Rainfall intensity, Watersheds(Basins).
Identifiers: *Geomorphic parameter, Hydrologic similitude.

A study was conducted on laboratory models under a rainfall simulator to isolate the geomorphic parameter of size of the drainage basin and to determine the relationship between relative size and selected hydrograph characteristics. Three different basin sizes and two drainage patterns were modeled but the soil depth, stream and slope gradients, and drainage densities were kept unchanged. The soil was simulated by 3/8 inch thick layer of polyurethane foam featuring a variety of pore sizes. The main conclusions were: the maximum peak increases with drainage area, time of concentration increases nonlinearly with drainage area, and the time base of the hydrograph and the decay time increase with the drainage area. A comparison of model data and the real-world watersheds indicated that the extent of relationship between the models and the real-world watersheds can be expressed in terms of a factor of similitude, which is highly correlated with the drainage area. (Singh-ISWS)
W76-00549

MEANDER IRREGULARITY AND WAVELENGTH ESTIMATION,
Hull Univ. (England). Dept. of Geography.
For primary bibliographic entry see Field 2E.
W76-00550

HYDROLOGY OF THE LAKE WINGRA BASIN, DANE COUNTY, WISCONSIN.
Geological Survey, Madison, Wis.
For primary bibliographic entry see Field 2H.
W76-00667

RAINFALL-RUNOFF RELATIONS ON URBAN AND RURAL AREAS,
Michigan Univ., Ann Arbor. Dept. of Civil Engineering.
E. F. Brater, and J. D. Sherrill.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-046, May 1975. 97 p, 36 fig, 11 tab, 39 ref. 1BB034; ROAP 21ATB; Task 008. 11040 DRS.

Descriptors: Watersheds(Basins), Michigan, *Mathematical models, Unit hydrographs, *Runoff, *Rainfall-runoff relationships, *Cities, *Infiltration, Surface runoff, *Storm runoff, *Rural areas, *Hydrograph analysis, Urbanization.
Identifiers: Infiltration/retention, Infiltration capacity.

A procedure was developed for estimating the frequency of storm runoff of various magnitudes from rainfall and/or snowmelt on small drainage basins in various stages of urbanization. The study was based primarily on the analysis of storm runoff events on real basins varying in size from 0.02 to 734 sq mi. The method is based on applying unit hydrographs to precipitations of various frequencies after deducting infiltration and retention. A concurrent study with an analytical drainage basin model provided additional understanding of the effects of some parameters. The unit hydrograph-infiltration capacity concept was selected as the most accurate practical method for predicting storm runoff. It was found that the form of the unit hydrograph could be related to drainage basin size and degree of urbanization as measured by population density. Other characteristics of the drainage basin are much less important. The form of the unit hydrograph stays relatively constant for various durations and magnitudes of input as long as the duration of input is smaller than a critical time which can also be related to the size and population density of the basin. As the population increased from rural to highly urbanized, peak discharges for the same runoff became as much as ten times greater. Infiltration capacity was found to vary seasonally. The predicition of flood frequency by this procedure is fully operable for Southeastern Michigan. For application to other areas some hydrograph analysis must be made. (EPA)
W76-00685

RATIONAL FORMULA NEEDS CHANGE AND UNIFORMITY IN PRACTICAL APPLICATION,
For primary bibliographic entry see Field 4A.
W76-00775

THE SHORTEST TIME SEQUENCE OF HEAVY RAINFALL AND ITS EFFECT ON STORM-WATER RETENTION TANKS (DIE KUERZESTE ZEITFOLGE VON STARKREGEN UND THRE AUSWIRKUNG AUF REGENBECKEN),
R. Pecher.
Wasser und Boden, Vol 24, No 10, p 303-304, 1972. 1 fig, 9 ref.

Descriptors: *Precipitation intensity, Data collections, Design criteria, Depth-area-duration analysis, Storage capacity, Storage requirements, Storm water, Discharge(Water).
Identifiers: West Germany.

Precipitation recordings at Munich-Bavariaring over 15 consecutive summer periods were conducted in an attempt to determine the shortest time sequence of heavy rainfall and the frequency of such periods, important factors when dimensioning storm water retention basins. While this 15-year period was too short to allow conclusions on the frequency of such heavy rainfall sequences, it was found that the intervals between rainfall of relatively low intensity are usually shorter than those between high-intensity rains. It is concluded that to avoid overloading storm water retention basins, design criteria for such basins should allow for discharge of storm water loads in less than 8 to 10 hours. (Sandoski-FIRL)
W76-00798

THE UNCERTAINTIES IN SEARCH OF DESIGN PRECIPITATIONS AS INPUT DATA FOR RAINFALL-RUNOFF-MODELS (DIE PROBLEMATIK BEI DER ERMITTLUNG VON MASSGEBLICHEN NIEDERSCHLAEGEN ALS EINGANGSDATEN FUER NIEDERSCHLAG-AB-FLUSS-MODELE),
U. Maniak.
Wasser und Boden, Vol 24, No 10, p 299-303, 1972. 8 fig, 19 ref.

Descriptors: *Rainfall-runoff relationships, Data collections, Distribution patterns, *Precipitation intensity, Probable maximum precipitation, *Risks.
Identifiers: West Germany.

Data on extended heavy rainfall events of small probability, to be used as input data for rainfall-runoff models, were derived from long-term rainfall recordings in northwestern Germany. The approximate values for events of maximum precipitation in that territory were in good accordance with extrema obtained for neighboring countries. Such events have low frequency. Parametric charts for the determination of the daily rainfall for a

specified period of time in any locality of the above territory are available with seasonal variations taken into consideration. A statistical approach to the evaluation of the territorial distribution can determine the maximum extension of heavy rainfalls. (Sandoski-FIRL)
W76-00799

ON APPLYING THE PRINCIPLE OF MAXIMUM ENTROPY TO HYDROLOGICAL PROBLEMS AND RUNOFF FORECASTING (O PRIMENENII PRINTSIPA MAKSIMUMA ENTROPPI V ZADACHAKH GIRDOLOGII I PROGNOZIROVANIYA STOKA),
For primary bibliographic entry see Field 4A.
W76-00804

ROLE OF SYNTHETIC TIME SERIES IN HYDROMETEOROLOGICAL DATA ANALYSIS,
Central and Southern Florida Flood Control District, West Palm Beach.
A. N. Shahane, D. Thomas, and P. Bock.
Water Resources Bulletin, Vol. 11, No. 4, p 770-782, August 1975. 2 fig, 5 tab, 12 ref.

Descriptors: *Time series analysis, *Synthetic hydrology, *Meteorology, *Statistical methods, *Evapotranspiration, Methodology, Hydrologic data, Stochastic processes, Analytical techniques, Hydrologic systems.
Identifiers: *Spectral analysis, *Sensitivity analysis, Stationarity, Harmonics.

The use of synthetic time series to increase confidence in the statistical parameters of limited hydrometeorological time series was investigated. A sensitivity analysis was performed to assess the effect of nonstationarity, number of lags, and small sample size on estimated spectral densities. The effects of harmonic-removal procedure on the residual series and the confidence limits in cross-spectral analysis were examined. Use of spectral analysis was found inadequate for investigating the effects of trend removal procedure on residual series. The synthetic time series analysis showed that such series were useful for selecting the proper number of lags, smoothing technique, and confidence limits. Sensitivity analysis performed on statistical variables of hydrometeorological and synthetic time series revealed the importance of proper number of lags and weights in cross-spectral analysis. Synthetic time series could be effectively used in detecting erratic behavior of the statistical parameters and in increasing confidence in the final estimates of statistical parameters. (Singh-ISWS)
W76-00891

MATHEMATICAL SIMULATION OF GROUNDWATER ABSTRACTION FROM CONFINED AQUIFERS FOR RIVER REGULATION,
Department of the Environment, Reading (England). Central Water Planning Unit.
For primary bibliographic entry see Field 2F.
W76-00904

2B. Precipitation

CLIMATE OF MINNESOTA, PART VIII--PRECIPITATION PATTERNS IN THE MINNEAPOLIS-ST. PAUL METROPOLITAN AREA AND SURROUNDING COUNTIES,
Minnesota Dept. of Natural Resources, St. Paul. Div. of Water, Soils and Minerals.
E. L. Kuehnast, D. G. Baker, and J. W. Enz.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-246 189, $3.75 in paper copy, $2.25 in microfiche. Tech. Bull 301, Agricultural Experiment Station, Univ. of Minn. 1975. 36 p, 25 fig, 10 tab, 11 ref. OWRT B-068-MINN (3).

Descriptors: *Minnesota, *Climates, *Precipitation(Atmospheric), *Rainfall, *Weather data, Cities, Water supply, Precipitation intensity.
Identifiers: *Urban climatology, Precipitation variation, *Minneapolis-St. Paul area.

This study concentrated on the monthly, seasonal, and annual precipitation that falls within the 7,200 square mile area centered around the Twin Cities of Minneapolis and St. Paul. Records from 75 stations were available for the 14-year period 1959-1972. It was determined that the May-September station density of one per 96 square miles is sufficient to detect more than 99 percent of the summer storms of 0.01 inch or more. The total annual precipitation averaged 29.17 inches, varying from 26.96 inches at Forest Lake to 32.39 inches at Ellsworth, Wisconsin. The major forecasting and observing station within the area, MSPAP (Minneapolis-St. Paul International Airport station), averaged only 27.08 inches, or 2.09 inches below the areal mean. Areas of persistently low precipitation centered around MSPAP, with two centers of high percipitation located to the northnorthwest and northeast of MSPAP in Hennepin and Washington Counties, respectively. The higher precipitation amounts in these two areas were limited to the May-September period. The differences in precipitation amounts between stations in high and low regions were found to be statistically valid. High precipitation areas are explained by the occurrence of low level moisture convergence zones that result from a combination of local topography, summertime convective activity, and the surface winds at the time of precipitation. Tornado paths within the area were shown to apparently prefer paths or alleys that more or less coincide with the orientation and location of the high precipitation areas. (See also W75-10009)
W76-00504

RAINFALL MEASUREMENTS ABOVE AND IN THE CANOPY OF A MIXED OAK FOREST,
Brussels Univ. (Belgium). Laboratoire de Botanique Systematique et d'Ecologie.
G. Schnock.
Oecol Plant. Vol 8, No 1, p 17-23. 1973. (English summary).

Descriptors: *Rainfall, Precipitation(Atmospheric), *Measurement, Forests, Oak trees, Rain gages, Canopy, *Throughfall.
Identifiers: Hornbeam, Oak, Belgium.

Measurement of total rainfall above the canopy shows that in all the cases known at present, the sizes of water collected at this level are always lower than those measured in the open on a near plot (meadow). Differences are essentially dependent of the wind speed, the model of rain gauge and the canopy roughness. With 3 shelterless rain gauges fixed at 5 m above the canopy, at the level of crowns and in a small opening into the limbs, 93.9, 94.7 and 97.6%, respectively, of total rainfall collected in open during a 10 mo. period was obtained. In an oak-hornbeam forest the deficit observed for a 14 mo. period reaches 21%. Throughfall and interception loss calculations for the mixed oakforest of Virelles (Belgium) with these different values lead to an overestimation of throughfall (8.4-11.7%) and an underestimation of interception (9.1-12.7%).--Copyright (c) 1974, Biological Abstracts, Inc.
W76-00583

THE SHORTEST TIME SEQUENCE OF HEAVY RAINFALL AND ITS EFFECT ON STORMWATER RETENTION TANKS (DIE KUERZESTE ZEITFOLGE VON STARKREGEN UND THRE AUSWIRKUNG AUF REGENBECKEN),
For primary bibliographic entry see Field 2A.
W76-00798

THE UNCERTAINTIES IN SEARCH OF DESIGN PRECIPITATIONS AS INPUT DATA FOR RAINFALL-RUNOFF-MODELS (DIE PROBLEMATIK BEI DER ERMITTLUNG VON MASSGEBLICHEN NIEDERSCHLAEGEN ALS EINGANGSDATEN FUER NIEDERSCHLAG-AB-FLUSS-MODELE),
For primary bibliographic entry see Field 2A.
W76-00799

PERFORMANCE CHARACTERISTICS OF 'BULK EFFECT' HUMIDITY SENSORS,
National Bureau of Standards, Washington, D. C., Mechanics Div.
For primary bibliographic entry see Field 7B.
W76-00886

ROLE OF SYNTHETIC TIME SERIES IN HYDROMETEOROLOGICAL DATA ANALYSIS,
Central and Southern Florida Flood Control District, West Palm Beach.
For primary bibliographic entry see Field 2A.
W76-00891

PRECIPITATION: ITS ACIDIC NATURE,
Pittsburg Univ., Pa. Dept. of Occupational Health.
For primary bibliographic entry see Field 2K.
W76-00900

RETARDATION OF CONDENSATION NUCLEI GROWTH BY SURFACTANT,
Missouri Univ., Rolla. Graduate Center for Cloud Physics Research.
J. Podzimek, and A. N. Saad.
Journal of Geophysical Research, Vol 80, No 24, p 3386-3392, August 20, 1975. 7 fig, 1 tab, 53 ref, 1 append. ONR N00014-69-A-0141-0005; NSF GA-36041.

Descriptors: *Condensation, *Drops(Fluids), *Surfactants, Model studies, Mathematical models, Monomolecular films, Chemicals, Alcohols, Retardants, Fog, Clouds, Particle size, Laboratory tests, Cloud physics, Meteorology.
Identifiers: *Drop growth, Cetyl alcohol, Cloud models.

A one-dimensiona cloud model was used to show how the coverage of droplets by surfactant films can suddenly change the growth of certain sizes of drops in a cloud drop spectrum. The retarded or accelerated growth depends upon the nature and thickness of the surfactant film, the size of the nuclei, and the cooling rate of the air parcel. The model also indicated some possibilities of how to influence the development of cloud drop spectra that grow on a specific type of nuclei. Small nuclei, which might greatly outnumber the large ones, can be quickly activated, and thereby a cloud or fog will become colloidally unstable. However, the final effect depends strongly upon the assumptions made for the distribution of a surfactant among different sizes of nuclei. (Sims-ISWS)
W76-00908

WEATHER MODIFICATION LAW DEVELOPMENTS,
Arizona Univ., Tucson.
R. J. Davis.
Oklahoma Law Review, Vol 27, No 3, p 409-439, 1974. 208 ref.

Descriptors: *Cloud seeding, *Artificial precipitation, *Artificial storms, *Weather modification, Droughts, Precipitation(Atmospheric), Administrative decisions, Contract administration, Water demand, Water rights, Project planning, Legislation, Penalties(Legal), Regulation, Administrative agencies.
Identifiers: *Environmental Impact Studies, *Agricultural community, *Weather control

norms, *Supplemental waters, Injunctive relief, Lobbying.

There is a developing body of statutory administrative, and case law concerning weather modification activities. Cloud seeding is used to aid agricultural recreational businesses by making rain or preventing hailstorms. This technique is controversial, however, because of the adverse side-effects such as flooding which may occur. In the absence of statute, courts have refused to characterize cloud seeding as an extra-hazardous activity, and persons seeking damages must prove actual damage and tortious conduct. There is a trend towards administrative rather than judicial resolution of conflicts. At least 31 states have statutes which deal with weather modification in some form. The general pattern is to authorize an agency to regulate cloud seeding. The prevalent techniques are registration of proposed projects, operational and professional licensing, governmental contracts for cloud seeding and public involvement. Several states authorize agencies to enjoin illegal weather modification activities. In the area of atmospheric water rights, the common law riparian rights doctrine would deny a cloud seeder access to water caused by the seeding unless he owned land bordering on a supplemental water source. Only Colorado and Utah have enacted laws recognizing that a landowner may appropriate atmospheric water. The most recent legislation emphasizes the environmetnal impact of weather control. The federal government has been most active in this area, particularly in funding pilot projects to test the long range effects of cloud seeding. Cloud seeding is currently prohibited in federal wilderness areas. This limited federal involvement in regulation of weather control will expand as seeding proposals take on intrastate and international importance. (Jenkins-Florida)
W76-00923

ENVIRONMENTAL LAW: WEATHER MODIFICATION-PROPOSED FEDERAL LEGISLATION AND THE OKLAHOMA WEATHER MODIFICATION ACT,
For primary bibliographic entry see Field 6E.
W76-00928

2C. Snow, Ice, and Frost

COMPRESSIBILITY CHARACTERISTICS OF UNDISTURBED SNOW,
Cold Regions Research and Engineering Lab. Hanover, N.H.
G. Abele, and A. J. Gow.
Research Report 336, May 1975. 57 p, 14 fig, 1 tab, 9 ref, append.

Descriptors: *Snow, *Compressibility, *Compressive strength, *Mechanical properties, Physical properties, Trafficability, Ice, Crystallization, Crystals, Crystallography, Glaciers, Stress, Density, Deformation, Compaction, Strength of materials, Temperature, Laboratory tests, Cold regions.

The effects of snow temperature, rate of deformation, and initial density on the stress vs. density and stress vs. deformation relationships were investigated in the pressure range of 0.1 to 75 bars. The rate of deformation in the range of 0.027 to 27 cm/sec did not have a significant effect. A decrease in temperature in the range of 0 to -40 degrees C increased the resistance to stress and deformation, the temperature effect increasing with applied pressure and initial density. The effect of initial density was significant. For any stress, an increase in the initial density resulted in an increase in the resulting density, particularly at low stress levels and at temperatures near 0 degrees C. The texture of artificially compacted snow was significantly different from that of naturally compacted snow of the same density because of the very short recrystallization time period. (Sims-ISWS)
W76-00537

FLOATING ICE THICKNESS AND STRUCTURE DETERMINATION--HEATED WIRE TECHNIQUE,
Department of the Environment, Ottawa (Ontario). Inland Waters Directorate.
R. O. Ramseier, and R. J. Weaver.
Environment Canada, Technical Bulletin 88, 1975. 16 p, 10 fig, 8 ref, 2 append.

Descriptors: *Ice, *Measurement, *Instrumentation, Lake ice, Sampling, Equipment, Gages, On-site data collections, Data collections.
Identifiers: *Floating ice, *Ice thickness, River ice, Ice measurement, Heated wire technique.

The thickness of floating ice is one of the most important general parameters to be measured for many applications in the fields of transportation, engineering and climatology. The requirement for accurate thickness information, with details on the ice structure, led to the development and use of the heated wire ice thickness gage. Once installed, the gage provides a means of making in-situ thickness measurements on fresh and salt water ice quickly and accurately. The measurement methods of determining ice structure from readings obtained were described, along with details of construction of the gage complete with engineering drawings. (Sims-ISWS)
W76-00884

ON THE ORIGIN OF PINGOS,
Vrije Universiteit, Amsterdam (Netherlands). Earth Sciences Inst.
H. Ryckborst.
Journal of Hydrology, Vol. 26, No. 3/4, p 303-314, August 1975. 4 fig, 16 ref.

Descriptors: *Permafrost, *Frozen soils, *Arctic, *Canada, Cold regions, Frost heaving, Soil mechanics, Hydrology, Ice, Tundra, Surface tension, Capillary action, Heat flow.
Identifiers: *Pingos, *Ice lenses, *Tuktoyaktuk peninsula(Canada).

Pingos on the Tuktoyaktuk peninsula, Northwest Territories, Canada, originate as upward-growing ice lenses above the water table in the active layer in sand whose pF value exceeds unity and is therefore unsaturated. The lenses grow at the base at a rate of 50-300 mm/yr, thus lifting the entire lens and overburden. They melt partially at the top (10-30 mm/yr) during the short arctic summer (100 days). Thin ice lenses, up to about 0.12 m, develop quite rapidly in sandy soils in a period of one winter. The intermediate lenses up to 14 m may grow in silty soils in a period of 75 years, whereas the slowly growing thick ice lenses such as pingos of 60 m require almost a millenium to develop. Pingos grow in areas of abundant water supply, e.g., ground-water-discharge areas. Under severe periglacial conditions the long-term average annual air temperature of -10C ensures a restricted summer melt of 10-30 mm/yr. This gives the pingo ice lens, which grows at the base at a rate of 50 mm/yr, a chance to develop slowly. The controlling factors for the growth of a pingo are the overburden pressure and the presence of a thin silt or clay lens embedded in the partly saturated sand at the pingo base. The silt or clay lens prevents the downward penetration of the growing ice lens and yet allows an upward water flow of 0.25 mm/day to exist. It is not likely that pingos will grow beyond a height 0f 60-70 m. (Sims-ISWS)
W76-00899

A DRAG PARTITION THEORY FOR DETERMINING THE LARGE-SCALE ROUGHNESS PARAMETER AND WIND STRESS ON THE ARCTIC PACK ICE,
Washington Univ., Seattle. Dept. of Atmospheric Sciences.
S. P. S. Arya.
Journal of Geophysical Research, Vol. 80, No. 24, p 3447-3454, August 20, 1975. 6 fig, 1 tab, 22 ref. NSF DES74-00964 A01.

Descriptors: *Ice, *Ice cover, *Arctic, *Model studies, Mathematical models, Sea ice, Drag, Stress, Boundary layers, Wind pressure, Cold regions, Arctic Ocean, Theoretical analysis.
Identifiers: *Roughness parameter(Ice), Drag partition.

A simple drag partition theory was developed for the classical problem of boundary layer flows over regular arrays of two- or three-dimensional roughness elements. The theoretical expression for the ratio of the form drag on these elements to the total drag was shown to be in good agreement with wind tunnel observations. It was used for determining the contribution of form drag on pressure ridges to the total wind stress on the arctic pack ice. The theory also lead to an expression for the large-scale roughness parameter as a function of mean ridge height, ridging intensity, small-scale or local roughness parameter, and an average form drag coefficient. It was required for determining the average wind stress over large areas of the Arctic on a routine basis, using the so-called geostrophic drag method, as invisaged in the Aidjex program. (Sims - ISWS)
W76-00909

ENVIRONMENTAL LAW: WEATHER MODIFICATION-PROPOSED FEDERAL LEGISLATION AND THE OKLAHOMA WEATHER MODIFICATION ACT,
For primary bibliographic entry see Field 6E.
W76-00928

2D. Evaporation and Transpiration

A THEORY FOR LOCAL EVAPORATION (OR HEAT TRANSFER) FROM ROUGH AND SMOOTH SURFACES AT GROUND LEVEL,
Cornell Univ., Ithaca, N.Y. School of Civil and Environmental Engineering.
W. Brutsaert.
Water Resources Research, Vol 11, No 4, p 543-550, August 1975. 7 fig, 40 ref.

Descriptors: *Evaporation, *Heat transfer, Atmosphere, Humidity, Shear, Turbulent flow, Eddies, *Model studies, Surface tension, Theoretical analysis, Interfaces, *Diffusion, Diffusivity, Drag, Shear stress.
Identifiers: *Similarity models, Turbulent transfer, Surface sublayer, Dimensionless parameters, Dalton number, Prandtl number, Surface roughness, Interfacial sublayer, Dynamic sublayer.

A model proposed in 1965 for evaporation as a molecular diffusion process into a turbulent atmosphere was extended by joining it with the similarity models for turbulent transfer in the surface sublayer. The assumed mechanisms were suggested by available flow visualization studies near smooth and rough walls; the theoretical result was in good agreement with available experimental evidence. The important dimensionless parameters governing the phenomenon near the surface were the Dalton (or Stanton) number (i.e., mass transfer coefficient), the drag coefficient, the roughness Reynolds number (except for smooth surfaces), and the Schmidt (or Prandtl) number. The proposed formualtion allowed the evaluation of the effects of some parameters, such as surface roughness or molecular diffusivity, that were not well understood before this. An importnat practical result was that, in contrast to the drag coefficient, the Dalton number is relatively insensitive to changes in roughness length. (Roberts-ISWS)

W76-00560

EVAPOTRANSPIRATION BY PHREATOPHYTES IN THE NORTH PLATTE BASIN OF WYOMING,
Wyoming Univ., Laramie. Water Resources Research Inst.
R. W. VanKlaveren, L. O. Pochop, and W. E. Hedstrom.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-246 194, $3.75 in paper copy, $2.25. Water Resources Series No 56, June 1975. 27 p, 5 fig, 8 tab, 17 ref. Partial completion report. OWRT A-014-WYO(2). 14-31-0001-5051.

Descriptors: *Phreatophytes, *Evapotranspiration, *Wyoming, Cottonwoods, Willow trees, Rivers, River basins, Vegetation, Tributaries.
Identifiers: *North Platte River Basin(Wyo), Laramie River(Wyo), Medicine Bow(Wyo), Sweetwater River(Wyo).

A survey of phreatophyte vegetation and its water usage was conducted for the North Platte Basin of Wyoming. The study was limited to the phreatophyte vegetation along the North Platte River and its three main tributaries: the Laramie, Medicine Bow, and Sweetwater Rivers. An estimated 90 to 95% of the phreatophytes were either cottonwoods or willows. Long-term annual average evapotranspiration rates of .94, .81, and .67 m for high, medium, and low density vegetation, respectively, were estimated using the Blaney-Criddle method. The total estimated long-term annual evapotranspiration was 8,121 hectare-meters for the four major rivers in the North Platte Basin of Wyoming.
W76-00673

ESTIMATING EVAPORATION: A TECHNIQUE ADAPTABLE TO REMOTE SENSING,
Agricultural Research Service, Phoenix, Ariz. Water Conservation Lab.
S. B. Idso, R. D. Jackson, and R. J. Reginato.
Science, Vol 189, No 4207, p 991-992, September, 1975. 3 fig, 7 ref.

Descriptors: *Evaporation, *Climatic data, *Estimating, *Soil surfaces, *Water loss, *Remote sensing, Model studies, Physical properties, Climatology, Solar radiation, Temperature, Water balance, Arid lands, Air temperature, Synthetic hydrology, Mathematical models, Thermal properties, Albedo, Air-earth interfaces, Soil temperature, Soil moisture, *Arizona.
Identifiers: Avondale loam, *Phoenix(Ariz).

A procedure given for calculating 24 hour totals of evaporation from wet and drying soils uses the following information: the daily solar radiation, maximum and minimum air temperatures, moist surface albedo (readily estimated or obtainable from a one-time measurement), and maximum and minimum surface temperatures (obtainable from surface or airborne sensors). Tests of the method on a bare field of Avondale loam at Phoenix, Arizona, have shown success regardless of season. (Robinett-Arizona)
W76-00701

EVAPOTRANSPIRATION,
Forest Service (USDA), Durham, N.H. Northeastern Forest Experiment Station.
C. A. Federer.
Reviews of Geophysics and Space Physics, Vol 13, No 3, p 442-445, 487-494, July, 1975. 238 ref.

Descriptors: *Evapotranspiration, Climatology, Environmental effects, Evaporation, Lysimeters, Soil moisture, Stomata, Transpiration, Water loss, Water vapor, Plant physiology, Turgidity, Water balance, Tracers, *Bibliographies.
Identifiers: Penman's equation, Monteith's equation.

The principal goal of evapotranspiration (ET) research is to find methods for calculating the value of ET under any given conditions. This study centers on ET as a physiologically controlled process, emphasizing stomatal behavior. Penman's equation is discussed along with water potential, water availability, and ET model systems. ET measurement by tracer techniques, lysimeters, and the Bowen ratio, is briefly discussed, and an analysis with Monteith's equation is included. Methods are needed for estimating watershed ET that are based on an understanding of the physics and physiology of evapotranspiration, not on soil moisture conditions. (Robinett-Arizona)
W76-00702

INFLUENCE OF SOIL-WATER POTENTIAL ON THE WATER RELATIONSHIPS OF HONEY MESQUITE,
Texas State Technical Institute, Amarillo.
S. J. Easter, and R. E. Sosebee.
Journal of Range Management, Vol 28, No 3, p 230-232, May, 1975. 3 fig, 32 ref.

Descriptors: *Soil moisture, *Plant physiology, *Semiarid climates, *Water loss, *Water requirements, Moisture tension, *Texas, Moisture availability, Moisture content, Moisture deficit, Soil-water-plant relationships, Desert plants, Range management, Plant growth, Mesquite, Hygrometry, Irrigation effects, Moisture stress, Transpiration, Plant growth.
Identifiers: Lubbock(Tex), Soil water potential, *Honey Mesquite(Prosopis glandulosa Torr. var. glandulosa).

Thermocouple psychrometry was used to measure soil and plant water potentials of honey mesquite growing under irrigated and nonirrigated field conditions. Irrigated trees showed more internal stress (Average minimum water potential=-30.9 bars) than nonirrigated trees (average minimum water potential=-19.4 bars). Water potential and transpiration rates adhered to a very distinct daily pattern with minimum water potential occuring at about noon in the trees growing on both sites. During the growing season, the average transpiration rate for irrigated trees was 0.0000959 grams/sq cm-minute, and .0000715 grams/sq cm-minute for nonirrigated trees. Irrigated trees produced 2 times the foliage of nonirrigated trees and had the greatest amount of soil water depletion. Results indicate that water loss in honey mesquite growing in upland sites or in shallow soils (relatively dry areas) is less than the amount lost from trees growing on bottomland and riparian sites. (Robinett-Arizona)
W76-00703

DROUGHT TOLERANCE OF PINE SEEDLINGS UNDER VARIOUS CLIMATIC CONDITIONS,
Agricultural Research Organization, Dor (Israel). Div. of Forestry.
For primary bibliographic entry see Field 2I.
W76-00712

THE INFLUENCE OF LOCAL ADVECTION ON EVAPO-TRANSPIRATION FROM IRRIGATED RICE IN A SEMI-ARID REGION,
Commonwealth Scientific and Industrial Research Organization, Griffith (Australia). Div. of Irrigation Research.
A. R. G. Lang, G. N. Evans, and P. Y. Ho.
Aricultural Meteorology, Vol 13, No 1, p 5-13, January, 1974. 3 fig, 1 tab, 18 ref.

Descriptors: *Lysimeters, *Evapotranspiration, *Moisture content, *Advection, Australia, Semi-arid climates, Irrigation, *Rice, Radiation, Newport, Evaporation.

In a semi-arid region, evapotranspiration from a flood-irrigated rice crop was determined with lysimeters at distances of 15, 60, 290 and 790 m. downwind from the edge. The expression E=ax(-)p+b gave the most consistent results. This indicates, in theory, that evapotranspiration can be measured from any position in the field. The study demonstrated that for practical purposes a correction for advection must be applied if the measurement was taken at the center of the field. (McLachlin-Arizona)
W76-00713

DIFFERING SENSITIVITY OF CORN AND SOYBEAN PHOTOSYNTHESIS AND TRANSPIRATION TO LEAD CONTAMINATION,
Illinois Univ., at Urbana-Champaign.
For primary bibliographic entry see Field 5B.
W76-00720

EFFECT OF TRANSPIRATION RATE ON SALT ACCUMULATION AROUND CORN ROOTS IN A SALINE SOIL,
Punjab Agricultural Univ., Ludhiana, India. Coll. of Agricultural Engineering.
For primary bibliographic entry see Field 3C.
W76-00827

COUPLING OF ENVIRONMENT TO PLANT RESPONSE: A SIMULATION MODEL OF TRANSPIRATION.
Washington State Dept. of Natural Resources, Olympia. Forest Land Management Center.
K. L. Reed, and R. H. Waring.
Ecology. Vol 55 No 1: p 62-72. 1974 Illus.

Descriptors: *Transpiration, Ecosystems, Model studies.
Identifiers: Douglas fir.

A low-resolution simulation model of transpiration was developed and run, with data from field studies in southwestern Oregon (USA). The output of the model served as a means of relating environmental variables to plant response. This relation was used to define an ordinate which, in conjunction with previously developed ecosystem ordinates, proved helpful for comparing ecosystems, predicting community composition and, in special cases, growth. The data requirements of the model are modest; we deliberately developed a model that can be used on data obtained from field studies where electric power is unavailable and use of sophisticated instrumentation is impossible. The model requires inputs of air and soil temperature, atmospheric humidity, seasonal plant water potential (expressed as plant moisture stress, the absolute value of plant water potential), and a model of stomatal behavior. Where it was impossible to obtain accurate data, stochastic models were used to provide the necessary input. The model simulated both potential and actual transpiration, the ratio of which is the most valuable single index of the seasonal moisture regime. Where no measurable stomatal control was exerted by Douglas-fir, the ratio was 1.0, indicating that adequate water was available to meet the transpiration demand. The ratio approached 0.3 on the drier locations. Significant changes in vegetation and growth were associated with this index.--Copyright 1974, Biological Abstracts. Inc.
W76-00902

2E. Streamflow and Runoff

HYDROLOGY FOR ENGINEERS AND PLANNERS,
Missouri Univ., Columbia. Dept. of Civil Engineering.
For primary bibliographic entry see Field 2A.
W76-00531

HYDROGRAPH RECESSION CONSTANTS FOR NEW SOUTH WALES STREAMS,
Department of the Environment and Conservation, Canberra (Australia).

B. Klaassen, and D. H. Pilgrim.
Civil Engineering Transactions, The Institution of Engineers, Australia, Vol CE17, No 1, p 43-49, 1975. 7 fig, 5 tab, 23 ref.

Descriptors: *Recession curves, *Hydrograph analysis, *Floods, *Surface runoff, *Subsurface flow, *Base flow, *Watersheds(Basins), *Surface-groundwater relationships, *Australia, Histograms, Geology, Hydrology, Streams, Overland flow.
Identifiers: *New South Wales.

Daily recession constants of surface runoff, interflow, and baseflow have been derived for 150 floods on 29 New South Wales catchments with areas larger than 250 sq km. Variations of interpretation by different analysts were shown to have a significant effect on the surface runoff values. For the three flow components, significant differences in recession constant values were found between coastal and inland catchments, and these correspond with broad-scale geological characteristics. Regional median values of baseflow and interflow recession constants were derived for use in design. Satisfactory relationships between recession constants and geological and physical characteristics of individual catchments could not be found, but tentative relations were presented. Published recession data from overseas were found to be comparable with the New South Wales data. Derived maximum baseflow and interflow discharges should provide a useful adjunct to the derived recession constants for interpretation of recessions and low flow characteristics. (Lardner-ISWS)
W76-00541

HYDROGRAPH RESPONSES TO WATERSHED MODEL SIZE AND SIMILITUDE RELATIONS,
State Univ. of New York at Syracuse. Coll. of Environmental Science and Forestry.
For primary bibliographic entry see Field 2A.
W76-00549

MEANDER IRREGULARITY AND WAVELENGTH ESTIMATION,
Hull Univ. (England). Dept. of Geography.
R. I. Ferguson.
Journal of Hydrology, Vol 26, No 3/4, p 315-333, August 1975. 10 fig, 3 tab, 22 ref.

Descriptors: *Meanders, *Geomorphology, *Wavelengths, Europe, *Rivers, River systems, River beds, Channel morphology, Channels, Channel erosion, Width, Dishcharge(Water), Streamflow, Streambeds, Variability.
Identifiers: *Meander bends, *Meander irregularity, Direction spectra, British river systems, Autocorrelograms, Spectral analysis, Meander scale.

Non-uniformity of local environmental conditions leads to differences in the axial orientation, length, and degree of development of individual meander bends, so that rivers vary in meander irregularity as well as in sinuosity and dominant wavelength. Wavelength estimation is therefore necessarily statistical; various methods were compared for 19 British river reaches digitized as direction series. For a given reach, mean bend length was strongly dependent on the sampling interval over which each direction measurement was made. Direction spectra were not significantly polymodal, in contrast to Speight's finding,s but dominant wavelengths were high or infinite because of valley bends. Better wavelength estimates were obtained from direction-change spectra, whose single peaks are not systematically affected by the choice of sampling interval; lack of resolution can be partly overcome by averaging estimates for different sampling intervals. Direction and direction-change autocorrelograms were generally of damped oscillatory form, and wavelengths estimated from direction-change autocorrelations correlated closely with spectral estimates. Both wavelengths were nearly linearly related to channel width and the square root of 1% duration discharge, irrespective of flow variability, width/depth, ratio or slope. (Lee-ISWS)
W76-00550

SHEAR DISTRIBUTION IN BENDS IN RECTANGULAR CHANNELS,
Uttar Pradesh Irrigation Research Inst., Roorkee (India).
For primary bibliographic entry see Field 8B.
W76-00552

THE SURFACE WATER SUPPLY OF THE UNITED STATES, 1966-70: PART 4. ST. LAWRENCE RIVER BASIN--VOLUME 1. BASINS OF STREAMS TRIBUTARY TO LAKES SUPERIOR, MICHIGAN, AND HURON,.
Geological Survey, Reston Va.
For primary bibliographic entry see Field 7C.
W76-00651

EVALUATION OF EFFECTS OF LAND-USE CHANGES ON STREAMFLOW,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 4C.
W76-00657

FLOOD-HAZARD STUDY--100-YEAR FLOOD STAGE FOR APPLE VALLEY DRY LAKE, SAN BERNARDINO COUNTY, CALIFORNAI,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 4A.
W76-00659

A HYDROLOGIC ASSESSMENT OF THE SEPTEMBER 14, 1974, FLOOD IN ELDORADO CANYON, NEVADA.
Geological Survey, Reston, Va.
P. A. Glancy, and L. Harmsen.
Available from Supt. of Documents, GPO, Wash, DC, 20402, price $1.15. Professional Paper 930, 1975. 28 p, 28 fig, 5 tab, 9 ref.

Descriptors: *Floods, *Flood data, *Flood damage, *Sediment transport, *Nevada, Streamflow, Flow rates, Peak discharge, Hydrologic data, Runoff, Storms, Evaluation.
Identifiers: *Eldorado Canyon(Nev).

A devastating flash flood of thunderstorm origin struck Eldorado Canyon, a 22.9 sq mi drainage with a history of flooding, in southern Nevada, at about 2:30 p.m., September 14, 1974. The flood killed at least 9 people, destroyed 5 trailer homes and damaged many others, obliterated a restaurant, destroyed 38 vehicles, 19 boat trailers, 23 boats, half of the boat-docking facilities, and the gas dock. The severe runoff resulted from intense basinwide rain and hail at rates up to 3 inches of precipitation per half an hour. Peak discharge was estimated to be 76,000 cfs just upstream from the developed area near the canyon mouth. About 2,000 acre-ft of runoff reached Lake Mohave, the canyon terminus. Runoff dumped an estimated 70,000 cu yd (about 100,000 tons) of inorganic sediment on Lake Mohave and throughout the lowermost canyon reach. It also delivered an estimated 4 acre-ft of organic or floating debris to Lake Mohave. The inorganic sediment was estimated to be less than 1 percent boulders, 40 to 60 percent gravel, 20 to 40 percent sand, and 10 to 25 percent silt-clay. (Woodard-USGS)
W76-00663

MAP SHOWING FLOOD-PRONE AREAS, COLORADO SPRINGS-CASTLE ROCK AREA, FRONT RANGE URBAN CORRIDOR, COLORADO,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 7C.
W76-00668

HYDROLOGIC UNIT MAP--1974, STATE OF NORTH CAROLINA.
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W76-00670

HYDROLOGIC UNIT MAP--1974, STATE OF FLORIDA.
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W76-00671

MODEL DEVELOPMENT AND SYSTEMS ANALYSIS OF THE YAKIMA RIVER BASIN -- FOREST HYDROLOGY MODEL,
Washington Univ., Seattle. Coll. of Forest Resources.
For primary bibliographic entry see Field 4D.
W76-00672

RELATIONSHIP OF DURATION OF FLOWS AND SELECTED WATERSHED PARAMETERS TO THE STANDING CROP ESTIMATES OF TROUT POPULATIONS,
Wyoming Univ., Laramie. Water Resources Research Inst.
For primary bibliographic entry see Field 4D.
W76-00674

FLOW ESTABLISHMENT AND INITIAL ENTRAINMENT OF HEATED WATER SURFACE JETS,
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
For primary bibliographic entry see Field 5B.
W76-00679

SIMULATION OF GAMMA-DISTRIBUTED FIRST-ORDER MARKOV CHAIN,
Department of the Environment, Ottawa (Ontario). Hydrology Research Div.
V. Klemes, and L. Boruvka.
Water Resources Research, Vol 10, No 1, p 87-91, February, 1974. 1 fig, 1 tab, 9 ref.

Descriptors: *Markov processes, *Simulation analysis, Hydrology, Mathematical studies, Mathematics.
Identifiers: *Markov chain, *Gamma distribution.

Simulation of a serially correlated series with a given marginal distribution is one of the important prerequisites of synthetic hydrology and of its applications to analysis of water resource systems. The problem has, however, no fully satisfactory solution because of the difficulties in defining other than normal multivariate distributions. The gamma-distributed first-order Markov chain is one of the most useful models of this category, since marginal distributions of many hydrologic variables can be approximated satisfactorily by the gamma distribution, and the limited understanding of the sequential behavior of the process combined with the smallness of available data samples often does not warrant models more sophisticated than the first-order Markov chain. (Skogerboe-Colorado State)
W76-00743

THE 1973 FLOOD AND MAN'S CONSTRICTION OF THE MISSISSIPPI RIVER,
Saint Louis Univ., Mo. Dept. of Earth and Atmospheric Sciences.
For primary bibliographic entry see Field 4A.
W76-00901

PROPERTY--CLASSIFYING BODIES OF WATER AS LAKES OR STREAMS,
W. M. Schultz, Jr.
Tulane Law Review, Vol 49, p 208-213, 1974. 41 ref.

Descriptors: *Classification, *Judicial decisions, *Legislation, *Lakes, *Streams, Bodies of water, Lake shores, Streamflow, Legal aspects, High water mark, Banks, Low water mark, Accretion(Legal aspects), Boundaries(Property), Currents(Water), Louisiana, Public rights, Adjacent land owners, Properties, Size, Shape, Depth, Public lands.
Identifiers: *Grand Lake, *Six Mile Lake, *State ownership, Legal test.

The Louisiana Supreme Court in State v. Placid Oil Co., articulated the legal test for classifying a body of water as a lake or stream. In Louisiana the state ceded ownership of the banks, or land between the ordinary high and low water marks, of navigable rivers and streams to the adjacent landowners. Regarding lakes, however, the state retained ownership of all lands below the ordinary high water mark. The issue in this case was ownership of a segment of the bank of a water body which turned on the question of whether the body of water was a stream or a lake. In prior cases the Louisiana courts had applied either an 'expanse of size' test or an 'alluvionforming current' test. The Supreme Court in the Placid Oil test merged the two tests and incorporated several additional elements to arrive at a multiple factor test. The test includes the size, shape, depth and current of the body of water. The multiple factor test will give the courts more freedom to weigh the public interest in the land when determining ownership. (Altuve-Florida)
W76-00931

THE VARIATION OF DISSOLVED CONSTITUENTS WITH DISCHARGE IN SOME NORFOLK RIVERS,
Yorkshire River Authority, Leeds (England) Pollution Prevention Dept.
For primary bibliographic entry see Field 5B.
W76-00991

DISSOLVED LOAD AND TENTATIVE SOLUTE BUDGETS OF SOME NORFOLK CATCHMENTS,
Yorkshire River Authority, Leeds (England). Pollution Prevention Dept.
For primary bibliographic entry see Field 5B.
W76-00992

2F. Groundwater

A GEOPHYSICAL METHOD FOR DETERMINATION OF AQUIFER PARAMETERS OF HARD ROCKS,
Central Water and Power Research Station, Poona (India).
M. Bardhan.
In: International Symposium on Development of Ground Water, November 26-29, 1973, Madras, India, Vol 1, pIb-11-Ib-21, 2 fig, 1 tab, 7 ref.

Descriptors: *Aquifer characteristics, *Aquifers, *Groundwater, Geophysics, Borehole methods, Logging(Recording), Tracers, Locating, Movement.
Identifiers: *Hard rock aquifers, Gamma-gamma logging, Neutron-neutron logging, Density logging.

Any geophysical method capable of giving all the essential aquifer parameters, namely porosity, permeability, transmissibility and specific yield, has to be a combination of techniques. In this model the objective is obtained through a tricomponent system, consisting of (1) gamma-gamma logging t delineate hard rock aquifer zones, (2) neutron-neutron logging to confirm these zones and determine their porosity, and (3) observation of the dilution of an injected tracer in the aquifer zone to determine the rate of ground water flow through them, from which the permeability and transmissability of the individual aquifers are determined. In gamma-gamma logging the quantum of measured gamma rays scattered by the formation can be translated in terms of bulk density of the medium logged. Hard rock aquifers show a lower value of bulk density. The neutron-neutron moisture logging detects the concentration of hydrogen in the formation. Thus the water table is easily located. Below the water table the measured values correspond to the effective porosity of the formation with hard rock aquifers exhibiting higher porosity than the unfractured massive rocks. Formulas for determining the flow rate in an aquifer from concentrations of dye in a formation through time have been developed. Field studies of this method have been made and the results at Kusuma dam site of the Bansagar Project, Madhya Pradesh, India are reported. The accuracy of the method is dependent on certain specific geostructural and geohydrologic conditions such as fracturing and its orientation, and is discussed. (Bradbeer-NWWA)
W76-00529

WATER RESOURCES OF HANCOCK COUNTY WITH EMPHASIS ON GROUND-WATER AVAILABILITY,
Indiana Dept. of Natural Resources, Indianapolis. Div. of Water.
For primary bibliographic entry see Field 7C.
W76-00534

A HELE-SHAW MODEL STUDY OF STEADY STATE FLOW IN AN UNCONFINED AQUIFER RESTING ON A SLOPING BED,
Govind Ballabh Pant Univ. of Agriculture and Technology, Pantnagar (India). Dept. of Agricultural Engineering.
C. S. Jaiswal, and H. S. Chauhan.
Water Resources Research, Vol 11, No 4, p 595-600, August 1975. 4 fig, 1 tab, 7 ref.

Descriptors: *Model studies, *Groundwater movement, *Slopes, *Seepage, Aquifers, Aquicludes, Water table aquifers, Equations, Height, Groundwater, Viscosity, Theoretical analysis, Steady flow.
Identifiers: *Hele-Shaw models, Sloping aquifers.

Experiments were conducted on a vertical Hele-Shaw model to study the effect of slope of an impermeable layer on flow profiles and flow rates in an unconfined aquifer. Experimental results were compared with the solutions of Pavlovsky (1930) and Childs (1971).for nonuniform seepage on a small sloping impermeable bed .These studies showed that the solution of Pavlosky may be used for the prediction of the flow profile downslope up to 30% slope and upslope up to 15% slope. Pavlosky's equations also predicted flow rates and normal depths satisfactorily up to 30% slope. Child's equations also predicted similar results. None of these equations predicted the flow rate on negative slope satisfactorily. (Visocky-ISWS)
W76-00540

THE ASSESSMENT OF REGIONAL GROUND-WATER SCHEMES BY RIVER-FLOW REGRESSION EQUATIONS,
Department of the Environment, Reading (England). Central Water Planning Unit.
For primary bibliographic entry see Field 4B.
W76-00548

GROUND-WATER RECHARGE SIMULATION,
New South Wales Univ., Kensington (Australia). Faculty of Military Studies.
A. C. Amar.
Journal of the Hydraulics Division, Proceedings of American Society of Civil Engineers, Vol 101, No HY9, Paper 11588, p 1235-1247, September 1975. 6 fig, 17 ref, 2 append.

Descriptors: *Groundwater recharge, *Simulation analysis, *Leplaces equation, *Dupuit-Forchheimer theory, *Potential flow, Groundwater, Mathematics, Equations, Unsteady flow, Recharge, Artificial recharge, Saturated flow, Numerical analysis, Mathematical studies, Free surfaces, Model studies.
Identifiers: *Groundwater mounds, *Type curves, *Finite-difference formulation.

Formulation and solution of a two-dimensional nonlinear computational model based on potential theory pertaining to a typical groundwater recharge pattern were presented. The objective of the present study was to direct attention toward a evaluation of the theoretical model by comparing it with the corresponding linear and nonlinear models based on Dupuit-Forchheimer approximations for the unsteady hydrodynamic behavior of the proposed recharge system under saturated flow conditions. Superiority in regard to generality of its application as well as accuracy of the results obtained was demonstrated by comparing it with the pertinent experimental data and presented in the form of dimensionless graphs. (Prickett-ISWS)
W76-00555

SALT WATER INTRUSION INTO POROUS MEDIA,
S. V. Regional Coll. of Engineering and Technology, Surat (India).
For primary bibliographic entry see Field 2L.
W76-00614

AQUIFER PARAMETER IDENTIFICATION,
California Univ., Los Angeles. Dept. of Engineering Systems.
W. W-G. Yeh.
Journal of the Hydraulics Division, Proceedings of American Society of Civil Engineers, Vol 101, No HY9, Paper 11582, p 1197-1209, September 1975. 2 fig, 2 tab, 27 ref, 2 append.

Descriptors: *Groundwater, *Aquifer characteristics, *Numerical analysis, *Unsteady flow, Aquifers, Optimization, Mathematical studies, Hydraulics, Equations, Subsurface water, Transmissivity, Mathematics, Linear programming, Analytical techniques, Diffusion, Diffusivity.
Identifiers: Inverse problem, Parameter identification.

An analysis of the inverse problem of parameter identification in unsteady groundwater flow was presented. The response of the system is governed by a typical nonlinear second- order partial differential equation for which there exists no closed-form solution. Identification is an inverse process whereby the parameters embedded in a differential equation are determined from observations of the system's input and output along with appropriate initial and boundary conditions. These parameters are usually not physically measurable. A simple but illustrative inverse problem was analyzed by quasilinearization, maximum principle, gradient method, the influence coefficient method, and linear programming. A comparison was made between these methods. The problem of convergence and stability was examined and demonstrated by numerical experimentation. (Prickett-ISWS)
W76-00650

GROUND-WATER LEVELS IN THE UNITED STATES, 1969-73: SOUTH-EASTERN STATES.
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W76-00652

GROUND-WATER BASIC DATA FOR GRANT AND SIOUX COUNTIES, NORTH DAKOTA,
Geological Survey, Bismarck, N. DAK.
For primary bibliographic entry see Field 7C.
W76-00653

ARTIFICIAL RECHARGE IN THE UPPER SANTA ANA RIVER AREA, SAN BERNARDINO COUNTY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 4B.
W76-00655

GROUND-WATER QUALITY IN INDIAN WELLS VALLEY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 5A.
W76-00658

THE GROUND-WATER SITUATION IN THE CIRCLEVILLE AREA, PICKAWAY COUNTY, SOUTH-CENTRAL OHIO,
Geological Survey, Columbus, Ohio.
For primary bibliographic entry see Field 4B.
W76-00661

SUMMARY APPRAISALS OF THE NATION'S GROUND-WATER RESOURCES-UPPER COLORADO REGION,
Geological Survey, Reston, Va.
D. Price, and T. Arnow.
Available from Supt. of Documents, GPO, Wash, DC, 20402, Price $3.15 (paper copy). Professional Paper 813-C, 1974. 40 p, 24 fig, 2 plate, 5 tab, 97 ref.

Descriptors: *Water resources, *Surface waters, *Groundwater resources, *Water supply, *Colorado River basin, Arizona, Colorado, New Mexico, Utah, Wyoming, Hydrologic data, Water yield, Streamflow, Aquifer characteristics, Water utilization, Water resource development, Projections, Available water.
Identifiers: Upper Colorado Region.

The Upper Colorado Region covers about 113,500 sq mi in parts of Arizona, Colorado, New Mexico, Utah, and Wyoming. Drainage from about 97 percent of the region is to the Colorado River. The predominantly arid to semiarid region averages about three persons per square mile and is used chiefly for grazing, recreation, and mineral development. The water supply comes from precipitation which averages about 95 million acre-feet per year. Development of the region's water supply has been limited almost entirely to surface water. Only about 2 percent of the total estimated volume of water withdrawn (about 5.7 million acre-ft) in 1970 came directly from groundwater sources. Recoverable groundwater in just the upper 100 feet of saturated rocks is estimated to be 115 million acre-feet. That amount is nearly four times the total active storage capacity of all surface-water reservoirs in the region. By the year 2020 consumptive use of water within the region and water exports to adjacent regions are expected to total more than 6.5 million acre-feet per year. (Woodard-USGS)
W76-00662

GROUNDWATER SEMINAR, GRANADA.
Food and Agriculture Organization of the United Nations, Rome (Italy).
For primary bibliographic entry see Field 4B.
W76-00807

GROUNDWATER RESERVOIRS: PHYSICAL BASES FOR THEIR USE,
Bureau de Recherches Geologiques et Minieres, Paris (France). Office of Geological and Mineral Research.
For primary bibliographic entry see Field 4B.
W76-00809

RECHARGING OF UNDERGROUND WATER DEPOSITS,
For primary bibliographic entry see Field 4B.
W76-00810

GROUNDWATER RESOURCES: EVALUATION AND EXPLOITATION,
Arizona Univ., Tucson. Dept. of Geoscience.
For primary bibliographic entry see Field 4B.
W76-00812

MODELS FOR GROUNDWATER ANALYSIS,
Harvard Univ., Cambridge, Mass.
For primary bibliographic entry see Field 4B.
W76-00816

WISCONSIN'S GROUNDWATER: AN INVALUABLE RESOURCE,
Wisconsin Univ., Madison. Cooperative Extension Programs.
D. Stephenson, and J. W. Clark.
Report G2651, October 1974. 19 p, 12 fig, 3 maps, 9 ref.

Descriptors: *Groundwater, *Groundwater resouces, *Wisconsin, Water supply, Water resources, Hydrologic cycle, Water properties, Zone of aeration, Zone of saturation, Recharge, Groundwater recharge, Discharge(Water), Aquifers, Wells, Water wells, Water quality, Regulation, Conservation, Pollutants.

Less than 1% of the earth's water is readily drinkable. Part of this 1% occurs in rivers, lakes, and ponds, but most of the good clean water is stored in the ground. Groundwater is a precious but limited resource; its quality can be destroyed easily. As the fast-growing population makes more demands on groundwater supply, a greater effort must be made to understand and protect it. This publication, designed to be understood by the general reader, is expected to aid public officials, study groups, teachers, and citizens of Wisconsin and other states. The properties of water, the world's total water system, and the hydrologic cycle were described. Further explanation was given of groundwater flow systems. Man's use of groundwater supplies was explored, and the problems of maintaining groundwater supplies and quality in the future were described. Maps depicted the thickness of glacial deposits in Wisconsin and probable well yields from bedrock and glacial deposits in the state. (Robinson-ISWS)
W76-00881

NUMERICAL MODEL OF FLOW IN A STREAM-AQUIFER SYSTEM,
Colorado State Univ., Fort Collins.
C. E. K. Rovey.
Hydrology Paper No. 74, August 1975. 73 p, 36 fig, 2 tab, 23 ref, 2 append. AID/csd-2460.

Descriptors: *Groundwater, *Surface water-groundwater relationships, *Simulation analysis, *Model studies, *Numerical analysis, *Colorado, Aquifers, Mathematical models, Computer models, Aquifer management, Base flow, Groundwater availability, Water resources development, Analytical techniques, Digital computers, Alluvial aquifers.
Identifiers: *Arkansas Valley, *Finite-difference techniques, Confined-unconfined aquifers.

A three-dimensional, finite difference model was developed for simulating steady and unsteady, saturated and unsaturated flow in a stream-aquifer system. The basis of the model was a finite difference form of Richard's equation for unsaturated and saturated subsurface flow. Effects of streamflow on groundwater movement were treated by applying the appropriate boundary conditions to Richard's equation. Contributions of groundwater to river flow were quantified by including seepage rates in the computation of river discharge. The three-dimensional model was developed for use in this study to interact with two-dimensional model segments, which were interfaced with the three-dimensional model on its upstream and downstream ends. The model produced results which matched observed data for the study area, which consisted of a 40-mile reach of the Arkansas Valley of southeastern Colorado. Computed estimates of river discharge at each end of the study area and water table elevations throughout the region agreed reasonably well with observed data. An analysis of the sensitivity of results produced by the model to variation in the values of several input parameters was included as part of the study. (Prickett-ISWS)
W76-00882

GROUND-WATER LEVELS, 1968-1972,
Oregon State Engineer's Office, Salem.
For primary bibliographic entry see Field 7C.
W76-00887

SUMMARY OF GROUND WATER QUALITY IN THE LOS ANGELES DRAINAGE PROVINCE,
California Dept. of Water Resources, Los Angeles. Southern District.
For primary bibliographic entry see Field 7C.
W76-00888

ENVIRONMENTAL ISOTOPIC STUDY OF THE BARREMIAN-JURASSIC AQUIFER IN SOUTH DOBROGEA (ROUMANIA),
Institutul de Meteorologie si Hidrologie, Bucharest (Rumania).
A. Tenu, P. Noto, G. Cortecci, and S. Nuti.
Journal of Hydrology, Vol. 26, No. 3/4, p 185-198, August 1975. 6 fig, 1 tab, 26 ref, 1 append.

Descriptors: *Isotope studies, *Groundwater movement, *Limestones, Aquifers, Carbonates, Oxygen isotopes, Carbon radioisotopes, Radioactive dating, Surface waters, Distribution patterns, Recharge, Deuterium, Velocity, Paleoclimatology, Mixing, Correlation analysis.
Identifiers: *Roumania, Danube River, Black Sea, Siutghiol Lake, SMOW(Standard Mean Ocean Water), PDB(Pee-Dee-Belemnite) standard.

The Barremian-Jurassic limestones represent the main groundwater aquifer supplying the South Dobrogea region. The waters from this aquifer have delta 018 and delta D values ranging from -12.8 to -11.0% and from -78.8 to -64.6% respectively, relative to SMOW. The delta C13 range is narrow, from -9.2 to -6.7% relative to PDB, while the C14 contents give corrected ages from 201 to 24,353 years. These data and their areal distributions in comparison with that of surface waters (Danube River, Siutghiol Lake, and Black Sea) have shown that: (1) the recharge area is on the west side of the region (in Ostrov district and to the south of it), and (2) the flow direction in the aquifer is WSW-ENE towards Siutghiol Lake. The water flow shows a unidirectional pattern on the west side with a constant velocity of 6.87 m/yr. There is a radial-divergent flow pattern on the east side, where the velocity of the main flow towards the lake is on the average 4.67 m/yr, while along a secondary direction it is 2.87 m/yr. (Visocky-ISWS)
W76-00894

THE USE OF ENVIRONMENTAL TRITIUM TO ESTIMATE RECHARGE TO A SOUTH-AUSTRALIAN AQUIFER,
Commonwealth Scientific and Industrial Research Organization, Glen Osmond (Australia). Div. of Soils.
G. B. Allison, and M. W. Hughes.
Journal of Hydrology, Vol. 26, No. 3/4, p 245-254, August 1975. 4 fig, 1 tab, 7 ref.

Descriptors: *Tritium, *Groundwater recharge, *Australia, Groundwater movement, Aquifers, Hydrogeology, Soil moisture, Sinks, Hydraulic gradient, Model studies, Mathematical models, Equations, Dispersion, Potentiometric level, Irrigation, Correlation analysis, Pumping, Evapotranspiration.

Identifiers: *South Australia, Padthaway-Keppoch Irrigation District, Naracoorte Range, Streamlines, Conceptual model, Piston flow, Fully mixed flow.

The tritium concentration of groundwater samples has been used to estimate the amount of water moving laterally into an aquifer as well as the quantity of local recharge. A multicompartment model used to calculate the variation of tritium concentration within the aquifer predicts that the lateral input of water is 24,000,000 cu m/yr, while local recharge is 27 mm/yr. These results are compared with conventional hydrogeological estimates of 18,000,000 cu m/yr and 70 mm/yr, respectively. (Visocky-ISWS)
W76-00896

MATHEMATICAL SIMULATION OF GROUNDWATER ABSTRACTION FROM CONFINED AQUIFERS FOR RIVER REGULATION,
Department of the Environment, Reading (England). Central Water Planning Unit.
A. B. Birtles, and W. B. Wilkinson.
Water Resources Research, Vol. 11, No. 4, p 571-580. August 1975. 13 fig. 17 ref.

Descriptors: *Groundwater, *Surface-groundwater relationships, *Simulation analysis, *Model studies, *Base flow, Aquifers, Mathematical models, Computer models, Numerical analysis, Aquifer management, Springs, Subsurface runoff, Water resources development, Analytical techniques, Digital computers, Flow nets.
Identifiers: *Finite difference method, *Implicit method.

The development of an initially confined aquifer for river regulation was considered. Model investigations covered a range of groundwater abstraction regimes and a number of aquifer systems typical of those found in the United Kingdom. The various factors affecting net gains were discussed. The main conclusions were that high net gains would be sustained only if unconfined storage was developed around the abstraction site. In practice this requires a high density of abstraction wells. Also, higher net gains could be obtained from those aquifers having a large response time. (Prickett - ISWS)
W76-00904

WATER RIGHTS,
Davis, Graham and Stubbs, Denver, Colo.
For primary bibliographic entry see Field 6E.
W76-00974

2G. Water In Soils

IMPACT OF FREEZING AND THAWING SOIL CONDITIONS ON THE MOVEMENT OF NUTRIENTS FROM RURAL LANDS,
Wisconsin Univ., Madison. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 5B.
W76-00502

SOIL CRUSTS.
Arizona Agricultural Experiment Station, Tucson. Technical Bulletin 214, (1974), 58 p. 192 ref. Edited by J. W. Cary and D. D. Evans.

Descriptors: *Soil physical properties, *Soil surfaces, *Soil management, *Soil cements, Soil strength, Soil sealants.
Identifiers: *Soil crusts, Cementing agents.

This publication is based on the research conducted by the scientists associated with the Wester Regional Research Project W-66 during the period 1964 to 1970. Significant progress was made toward understanding and improving the management of crusting soils; since the subject is relatively narrow, it was possible to cover most aspects of crusting in a single publication. The first chapter is written for a broad audience, including all those who are faced with practical problems involving soil crusts. Chapters 2 through 5 are more detailed, and provide the technical background required for in-depth understanding of soil crust behavior. In addition to the information presented in this bulletin that has not been previously published, a rather extensive review and discussion of appropriate literature has also been included. (See W76-00518 thru W76-00524)
W76-00517

MANAGEMENT OF CRUSTING SOILS: SOME PRACTICAL POSSIBILITIES,
Colorado State Univ., Fort Collins. Engineering Research Center.
W. D. Kemper, and D. E. Miller.
In: Soil Crusts, Arizona University Agricultural Experiment Station, Technical Bulletin 214, 1974. p 1-6, 3 fig. J. W. Cary and D. D. Evans, eds.

Descriptors: *Soil physical properties, *Soil surfaces, *Hydraulic conductivity, *Organic matter, *Vegetation effects, Runoff, Erosion, Soil management, Plant growth, Soil water movement, Bulk density, Cover crops, Irrigation, Mulching, Cultivation, Surface sealing.
Identifiers: *Soil crusts.

Soils with low organic matter and high silt content usually have low aggregate stabilities which are commonly associated with soil crusting. High levels of sodium make these problems even more severe. Soils with higher organic matter contents (2 or 3 percent or more) are less susceptible to crusting which is attributed to long organic molecules acting as glues holding particles together in fairly stable aggregates. Organic matter may also reduce swelling pressure forces and wetting rates, and modify surface tension forces. A permanent cover crop, such as grass, increases soil organic matter, but much is lost under row crop conditions because of exposure of new surfaces and accelerated microorganism decomposition. (See also W76-00517) (Robinett-Arizona)
W76-00518

MODIFICATION OF SOIL CRUSTS FOR PLANT GROWTH,
Agricultural Research Service, Prosser, Wash. Irrigated Agriculture Research and Extension Center.
D. E. Miller, and R. O. Gifford.
In: Soil Crusts, Arizona University Agricultural Experiment Station, Technical Bulletin 214, p 7-16, 1974, 4 fig, 3 tab. J. W. Cary and D. D. Evans, eds.

Descriptors: *Soil physical properties, *Plant growth, *Mulching, *Soil compaction, *Vegetation establishment, Soil surfaces, Hydraulic conductivity, Runoff, Erosion, Soil management, Soil water movement, Irrigation, Cultivation, Soil properties, Surface sealing, Soil moisture.
Identifiers: *Seedlings, *Soil crusts.

Probably the most important effect of soil crusts is on emergence and early development of seedlings. Also, seedlings may be injured by soil movement during cultivation of a crusted soil. Reducing water drop impact by surface mulches or reducing the water drop momentum by reducing droplet size and application rates are methods of preventing crusts. A group of seedlings has a better chance of crust penetration than does a single seedling and keeping the soil moist during seedling emergence will decrease crust strength. (See also W76-00517) (Robinett-Arizona)
W76-00519

BONDING MECHANISMS FOR SOIL CRUSTS: PART I. PARTICLE SURFACES AND CEMENTING AGENTS,
Hawaii Univ., Honolulu. Dept. of Agronomy and Soil Science.
G. Uehara, and R. C. Jones.
In: Soil Crusts, Arizona University Agricultural Experiment Station, Technical Bulletin 214, 1974 p 17-28, 8 fig, 1 tab. J. W. Cary and D. D. Evans, eds.

Descriptors: *Soil physical properties, *Soil surfaces, *Surface sealing, *Soil cement. *Soil chemistry, Particle size, Cation exchange, Ions, Cation absorption, Crystallization, Clays, Minerology, Silicates, Organic matter, Gypsum, Lime.
Identifiers: *Soil crusts, Cementing agents.

Factors which are know to affect soil structural stability include mineralogy of layered silicates, texture, composition of sorbed cations, and concentration of various organic substances, silica and sequioxides. Charge characteristics, crystal imperfections, surface coatings, the role of water and texture in crust development, silica, organic matter, and gypsum and lime in relation to soil crust formation are discussed. (See also W76-00517) (Robinett-Arizona)
W76-00520

BONDING MECHANISMS FOR SOIL CRUSTS: PART II. STRENGTH OF SILICA CEMENTATION,
Nevada Univ., Reno, Plant, Soil and Water Science Div.
R. O. Gifford, and D. F. Thran.
In: Soil Scrust, Arizona University Agricultural Experiment Station, Technical Bulletin 214, p 28-30, 1974, 1 fig, 1 tab. J. W. Cary and D. D. Evans.

Descriptors: *Silica, *Soil physical properties, *Soil surfaces, *Soil cement, *Silicates, Surface sealing, Soil chemistry, Crystallization, Minerology, Clays, Tensil strength, Strength of materials, Soil strength, Soil chemical properties, Particle shape.
Identifiers: *Soil crusts, Cementing agents.

Glass beads were washed to remove surface alkali. When a drop of distilled water was placed around a group of these beads, the spheres were rolled together by surface tension as the drop of water evaporated. Water evaporated last from the points of contact between the spheres where any dissolved material was concentrated resulting in cementation of the beads. Strength of cementing material measured was significant but it probably can explain only a part of the strength of natural soil crusts. (See also W76-00517) (Robinett-Arizona)
W76-00521

CRUST STRENGTH AND CRACKING: PART I. STRENGTH,
Colorado State Univ., Fort Collins. Engineering Research Center.
W. D. Kemper, D. D. Evans, and H. W. Hough.
In: Soil Crusts, Arizona University Agricultural Experiment Station, Technical Bulletin 214, p 31-38, 1974, 6 fig. J. W. Cary and D. D. Evans, eds.

Descriptors: *Soil Physical Properties, *Soil surfaces, *Particle shape, *Soil strength, *Soil chemical properties, Soil cement, Soil chemistry, Particle size, Minerology, Crystallization, Strength of materials, Bonding, Molecular structure, Cultivation, Wetting.
Identifiers: *Soil crusts, Crust strength.

In general the strength of soil crusts depends on the strength of particle-to-particle bonds, and may be written as: Crust strength equals (Bond strength, number of bonds, particle shape). The effect of soil components and wetting and cultivation history on crust strength, is primarily through their effects on these 3 parameters. (See also W76-00517) (Robinett-Arizona)

W76-00522

CRUST STRENGTH AND CRACKING: PART II. CRACKING,
Agricultural Research Service, Pendleton, Oreg. Columbia Plateau Conservation Research Center.
R. W. Rickman.
In: Soil Crusts, Arizona University Agricultural Experiment Station, Technical Bulletin 214 p 39-44, 1974, 4 fig, 1 tab. J. W. Cary and D. D. Evans, eds.

Descriptors: *Soil physical properties, *Soil surfaces, *Soil strength, *Cracks, *Elasticity(Mechanical), Soil cement, Soil chemistry, Strength of materials, Soil compaction, Soil properties, Elastic theory, Soil moisture, Moisture content, Soil density.
Identifiers: *Soil crusts, Cracking, Griffith's cracking theory.

The application of Griffith's cracking theory to soils requires that material properties used in the theory (Elastic modulus and critical energy release rate) be measured as a function of water content and soil density. The modulus of rupture technique appears to be sufficient to obtain energy release rates. Several techniques are available to obtain elastic modulus for soils, including static methods for highly compacted soils in the laboratory or in the field for uncompacted soils. (See also W76-00517) (Robinett-Arizona)
W76-00523

THE INFLUENCE OF SOIL CRUSTS ON HEAT AND WATER STORAGE,
Agricultural Research Service, Kimberly, Idaho. Snake River Conservation Research Center.
J. W. Cary, and D. D. Evans.
In: Soil Crusts, Arizona University Agricultural Experiment Station, Technical Bulletin 214, p 45-54, 1974, 5 fig. J. W. Cary and D. D. Evans, eds.

Descriptors: *Soil physical properties, *Soil surfaces, *Soil moisture, *Soil temperature, *Heat transfer, Soil cement, Soil properties, Moisture content, Thermal properties, Soil-water-plant relationships, Water storage, Infiltration, Infiltration rates, Erosion, Flooding, Water vapor, Soil density, Soil texture, Vegetation establishment.
Identifiers: *Soil crusts.

A soil crust can reduce water intake by one or two orders of magnitude, which may result in flooding and erosion. Effects of crusts on water vapor and heat exchange between the soil and atmosphere are more subtle, but nonetheless real. The extent and depth of cracking, soil density, surface texture, and color are important. Severe soil crusts may have the greatest effects on water and energy exchange by preventing the establishment of plants. (See also W76-00517) (Robinett-Arizona)
W76-00524

THE EFFECT OF SOIL CRUSTS ON INFILTRATION: THE EFFECT OF AGGREGATE SIZE AND DEPTH OF TILLAGE ON STEADY INFILTRATION THROUGH CRUST-TOPPED TILLED SOILS,
Minnesota Univ. St. Paul.
D. A. Farrell.
Meded Fac Landbouwwet Rijksuniv Gent., Vol 37, No 3, p 1132-1149. 1972

Descriptors: *Infiltration, Capillary conductivity, Soil aggregates, Soils, Cultivation.
Identifiers: *Soil crusts.

A theoretical study of a crusted tilled soil was reported. The capillary conductivity of an aggregated tilled layer was calculated from geometrical considerations. From this information the effect of aggregate size, depth of aggregate bed, and hydraulic resistance of surface crust upon final infiltration rate can be calculated.--Copyright 1974, Biological Abstracts, Inc.

W76-00539

EMPIRICAL METHODS OF USING SOILS AS RADIATION DOSIMETERS,
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
For primary bibliographic entry see Field 5A.
W76-00542

VOID CHANGES IN ALLOPHANE SOILS DETERMINING WATER RETENTION AND TRANSMISSION,
Macdonald Coll., Montreal (Quebec). Dept. of Soil Science.
T. Maeda, and B. P. Warkentin.
Soil Science Society of America Proceedings, Vol 39, No 2, p 398-403, May-June 1975. 13 fig, 2 tab, 17 ref.

Descriptors: *Soil water movement, *Retention, *Voids, *Diffusivity, *Drying, Compacted soils, Saturation, Hydraulic conductivity, Infiltration, Porosity, Bulk density, Wet climates, Clays, Porous media, Shrinkage, Laboratory tests.
Identifiers: *Allophane soils, *West Indies, *Japan, Amorphous clays, Soil columns.

Water retention and transmission were measured on eight samples of allophane soils from the West Indies and Japan. Standard methods of pressure plate, horizontal infiltration, and steady-state horizontal flux were used. Soils with high allophane content had a sigmoid water content vs. log suction curve. Drying did not change the shape of the curve, but decreased the water content at any suction. Soils with low allophane content showed a more linear water content vs. log suction curve, resembling that of clay soils with crystalline minerals. Water tranmission in undried allophane soils was slow because of the high proportion of microvoids. Air-dried or oven-dried samples had a higher proportion of macrovoids, and more rapid infiltration of water. This change in void size distribution was large enough to dominate the effect of greater volume of voids to be filled with water in an initially dry soil, with the result that water movement in allophanes increased as initial water content decreased. (Schicht-ISWS)
W76-00559

HYDROSALINE REGIME OF SOME SOILS IN THE MIDDLE PART OF THE CALMATUI RIVER BASIN. (IN RUMANIAN),
Institutul de Studii si Cercetari Pedologie, Bucharest (Rumania).
G. Obrejanu, G. Sandu, N. Rudzic, S. Nastea, and G. Cosma.
An Inst Stud Cercet Pedol. 39 p, 445-459. 1971 Illus. English summary.

Descriptors: Soils, Soil types, *Saline soils, *River basins, Europe, Soil groups, *Chernozems, *Soil investigations, *Salinity, Percolation, Leaching, Irrigation effects.
Identifiers: Calmatui River, Hydro selinity, Solonchak, Solonetz.

The hydrosaline regime of 3 representative genetic soil types located in the middle part of the Calmatui river basin was studied between 1963-1969. The soils were: low-terrace chernozem salinized and solonized in depth of the profile; cropped solonetz and solonetz-solonchak. Soil water regime was represented by chronoisopleths given on available water categories, while the salt regime was represented by chronizopleths of mineral residue. Evolution of water and salt regimes in the soil profile is presented, and their strong relationship is stressed. The positive influence of tillage works on both soil hydrosaline regime and soil-forming process direction is emphasized. The terrace chernozem salinized and solonized in depth of profile possess an alternating, percolative, desuctive hydrosaline regime with salts accumulation at depth. Under the influence of tillage, columnar solonetz exhibits a hydrosaline regime characteristic to periodically irrigated, cropped soils with an intense desalinizating percolation. The solonetz-solonchak is characterized by an unpercolative-exudative hydrosaline regime in the upper part, while weakly desuctive, at depth. Under the influence of both drainage canals and vegetation the hydrosaline regime became percolative-exudative with alternating periods of leaching and upward movement of soluble salts. Copyright 1974, Biological Abstracts, Inc.
W76-00573

STEADY INFILTRATION FORM BURIED, SURFACE, AND PERCHED POINT AND LINE SOURCES IN HETEROGENEOUS SOILS: II. FLOW DETAILS AND DISCUSSION,
Commonwealth Scientific and Industrial Research Organization, Canberra (Australia). Div. of Environmental Mechanics.
J. R. Philip, and R. I. Forrester.
Soil Science Society of America Proceedings, Vol 39, No 3, p 408-414, May-June 1975. 10 fig, 7 ref.

Descriptors: *Soil water movement, *Infiltration, *Steady flow, *Unsaturated flow, *Equations, Gravitational water, Percolation, Seepage, Soil moisture, Potential flow, Soil properties, Soil water, Irrigation, Subsurface irrigation, Infiltration rates, Soils, Groundwater, Furrow irrigation.
Identifiers: *Point and line sources, *Trickle irrigation, *Moisture potential.

Previous word developed physically relevant source solutions of the quasilinearized steady infiltration equation, generalized to apply to heterogeneous soils with conductivity depending exponentially on both moisture potential and depth. The results were discussed here in further detail, and graphs of a wide range of solutions were included. The graphical solutions presented spacially distributed Stokes stream and moisture potential functions for various depth-dependent conductivities. (See also W72-08207) (Prickett-ISWS)
W76-00649

EFFECT OF DAILY IRRIGATION ON WATER CONTENT AND SUCTION PROFILES IN SOILS OF THREE TEXTURES,
Agricultural Research Service, Prosser, Wash. Western Region.
D. E. Miller.
Soil Science Society of America Proceedings, Vol 39, No 3, p 512-515. May-June 1975 5 fig, 5 ref.

Descriptors: *Irrigation effects, *Soil texture, *Soil water movement, *Soil types, *Moisture tension, Drainage effects, Evapotranspiration, Irrigation, Irrigation efficiency, Plant growth, Soil physical properties, Soil properties, Soil-water-plant relationships, Moisture content, Soil moisture, Soil profiles, Infiltration, Soil types, Hydraulic conductivity.

Soil irrigated to replace just evapotranspiration losses produced profiles that depended upon the flow characteristics of the soil. In Shano silt loam in which the water moved readily, water distribution was nearly uniform with depth and did not change time. In soils in which water moved slowly, either because of slow internal water movement when wet (Ritzville loam) or low unsaturated conductivities at relatively low suctions (Sagehill sand), the upper soil became wetter while the lower soil water decreased by a corresponding amount. With the soil profile initially wet, several weeks of deficit irrigation passed before surface soil water content changed markedly. (Robinett-Arizona)
W76-00697

SOIL WETTABILITY AND FIRE IN ARIZONA CHAPARRAL,
Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

D. G. Scholl.
Soil Science Society of America Proceeding, Vol 39, No 2, p 356-361. March-April, 1975 4 fig, 1 tab, 18 ref.

Descriptors: *Infiltration, *Penetration, *Wettability, *Burning, *Soil surfaces, Hydraulic conductivity, Permeability, Pervious soils, Soil management, Soil physical properties, Soil properties, Soil structure, Soil types, Soil chemical properties, Wetting, Interfaces, *Arizona, Chaparral, Arid lands, Range management, Forest fires, Forest management, Volitility, Thermal properties, Organic matter.
Identifiers: Wetting angle, Water repellent soils.

Soils on typical Arizona chaparral sites showed water repellence both before and after fire. Field and laboratory fires caused major changes in the water repellency of 4 natural soil layers, with relatively cool fires causing repellency at the surface and hot fires producing repellence at a greater depth but rendering the surface layer completely wetable. Measurement of the wetting angle of soil layers from progressively hotter fires made it possible to determine temperatures where water-repellent layers are first formed and then destroyed. Volatilization and subsequent loss to the atmoshpere is believed to be an important part of the loss of organic matter which decreased at the progressively higher temperatures. At temperatures above 270 C, the material causing water repellence is almost completely lost while below 270 C sufficient material is trapped and condensed on exchange sites to produce water repellence. (Robinett-Arizona)
W76-00698

IRRIGATION METHOD AS A DETERMINANT OF LARGE PORE PERSISTENCE AND CRUST STRENGTH OF CULTIVATED SOILS,
Colorado State Univ., Fort Collins. Dept. of Agricultural Engineering.
W. D. Kemper, J. S. Olsen, and A. Hodgdon.
Soil Science Society of America Proceedings, Vol 39, No 3, p 519-523, May-June 1975. 6 fig, 1 tab, 6 ref.

Descriptors: *Wetting, *Air entrainment, *Irrigation systems, *Soil surfaces, *Soil physical properties, Hydraulic conductivity, Infiltration, Permeability, Interstices, Soil properties, Soil structure, Soil types, Wettability, Aeration, Saturated soils, Soil gases, Irrigation, Pores, Capillary conductivity, Pore pressure, Flooding, Soil aggregates, Saturation, Capillary action.
Identifiers: Crust strength, Modulus of rupture, Seedling emergence.

Air dried soils were wetted by flooding, immersion, slow immersion and capillary action resulting in successively slower rates of wetting. Slow capillary wetting of a weekly structured soil allowed retention of more large size pore space than did rapid wetting of a well structured soil. Breaking strength of dried soils which had been wet by rapid immersion, capillary action, and capillary action followed by immersion, was much greater for soils wet by rapid immersion. Immersion following slow capillary wetting resulted in soils with intermediate breaking strengths. A study on corn (Zea mays L.) seedling emergence from a weakly structured soil showed less than 50% emergence for flooding and up to 100% for capillary wetting. (Robinett-Arizona)
W76-00699

ESTIMATING EVAPORATION: A TECHNIQUE ADAPTABLE TO REMOTE SENSING,
Agricultural Research Service, Phoenix, Ariz. Water Conservation Lab.
For primary bibliographic entry see Field 2D.
W76-00701

REHABILITATION OF LAND DISTURBED BY SURFACE MINING COAL IN ARIZONA,
Arizona Univ. Tucson. Dept. of Watershed Management.
For primary bibliographic entry see Field 5G.
W76-00709

RESPONSE TO THREE SEMIDWARF MEXICAN WHEATS TO DIFFERENT AERATION CONDITIONS IN THE ROOTING MEDIUM AT A CONSTANT SALINITY LEVEL,
Escuela Nacional de Agricultura Chapingo (Mexico).
For primary bibliographic entry see Field 3C.
W76-00710

FIELD STUDY OF SOLUTE MOVEMENT IN A HIGHLY AGGREGATED OXISOL WITH INTERMITTENT FLOODING: II. PICLORAM,
Hawaii Univ., Honolulu, Dept. of Agronomy and Soil Science.
For primary bibliographic entry see Field 5B.
W76-00718

COLUMN STUDIES OF SOIL CLOGGING IN A SLOWLY PERMEABLE SOIL AS A FUNCTION OF EFFLUENT QUALITY,
Wisconsin Univ., Madison Dept. of Soil Science.
For primary bibliographic entry see Field 5B.
W76-00721

NITRATE AND CHLORIDE LEACHING IN A SWELLING CLAY SOIL,
Agricultural Research Service, Temple, Tex. Blackland Conservation Research Center.
For primary bibliographic entry see Field 5B.
W76-00724

NITRATE CONCENTRATIONS IN DEEP SOIL CORES AS RELATED TO SOIL PROFILE CHARACTERISTICS,
Californai Univ., Riverside. Dept. of Soil Science and Agricultural Engineering.
For primary bibliographic entry see Field 5B.
W76-00726

A SIMULATION MODEL FOR PREDICTION OF HERBICIDE PERSISTENCE,
National Vegetable Research Station, Wellesbourne (England).
For primary bibliographic entry see Field 5B.
W76-00730

THE CONTROL OF NITRATE ACCUMULATION IN SOILS BY INDUCED DENITRIFICATION,
Technion-Israel Inst. of Tech., Haifa.
For primary bibliographic entry see Field 5B.
W76-00732

SMALL TENSIOMETERS FOR FIELD AND LABORATORY STUDIES,
Agricultural Research Service, Gainesville, Fla.
J. S. Rogers.
Soil Science Society of America Proceedings, Vol 38, No 4, p 690-691, July-August, 1974. 1 fig.

Descriptors: *Tensiometers, Laboratory equipment, Soil moisture, Soil water, Soil investigations.

A small tensiometer was constructed and used in field and laboratory studies. The units are suitable only for low suctions, but have the fast response time that is desirable for measuring short-term changes in field and laboratory studies of drainage. Several tensiometers have been in use for over 4 years and continue to perform very satisfactorily. (Skogerboe-Colorado State)
W76-00733

EFFECT OF SALTS AND SALTS PLUS NITROGEN-15-LABELED AMMONIUM CHLORIDE ON MINERALIZATION OF SOIL NITROGEN, NITRIFICATION, AND IMMOBILIZATION,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
For primary bibliographic entry see Field 3C.
W76-00735

MORE ON AN APPROXIMATE SOLUTION FOR NONLINEAR DIFFUSION,
Cornell Univ., Ithaca, N.Y. Coll. of Engineering.
W. Brutsaert.
Water Resources Research, Vol 10, No 6, p 1251-1252, December 1974. 11 ref.

Descriptors: *Diffusion, Mathematical studies, Soil water, Soil water movement, *Diffusivity.

A method of solution developed earlier (1970) (See also W70-07010) for a diffusivity, that is, a power function of concentration, is shown to be more generally applicable. On of the conditions of its applicability is the existence of a sharp diffusing front. As an illustration the solution is worked out herein for a diffusivity that has been useful in the analysis of soil water problems. (Skogerboe-Colorado State)
W76-00740

COMPUTER MODELING OF NITROGEN TRANSFORMATIONS IN SOILS,
California Univ., Davis. Dept. of Water Science and Engineering.
M. Mehran, and K. K. Tanji.
Journal of Environmental Quality, Vol 3, No 4, p 391-395, October-December, 1974. 7 fig, 1 tab, 20 ref.

Descriptors: *Nitrification, *Denitrification, *Model studies, *Nitrogen, Computer models, Soil profiles, Soil investigations, Water pollution sources.

A nitrogen-transformation model was formulated for simultaneous computation of various N transformations: nitrification, denitrification, mineralization, immobilization, ion exchange, and plant uptake. These processes were assumed to obey first-order kinetics. Differential equations that describe the above processes are solved simultaneously by using the 4th-order Runge-Kutta method and the Adams-Bashforth-Moulton predictor-corrector equations. The computer model was tested against data reported from several incubation studies. This model could be linked to a transport model to predict the temporal and spatial distribution of various N species in soil profiles. (Skogerboe-Colorado State)
W76-00831

NITRATE OCCURRENCE IN SOME SOILS WITH AND WITHOUT NATRIC HORIZONS,
Illinois Univ., Urbana. Dept. of Agronomy.
E. P. Gentzsch, E. C. A. Runge, and T. R. Peck.
Journal of Environmental Quality, Vol 3, No 1, p 89-94, January-March, 1974. 1 fig, 5 tab, 14 ref.

Descriptors: *Nitrates, *Nitrogen, *Soil properties, *Soil horizons, Soil investigations, Fertilization, Fertilizers, Groundwater, Water quality, *Illinois.
Identifiers: Natric horizons.

The effect of animal activity and fertilizer practices on the nitrate content in soils with and without natric horizons was investigated in a field study in southern Illinois where excessive groundwater nitrate levels were reported. Most of these soils are poorly drained. A comparison is provided by the poorly and well-drained soils without natric horizons observed in central Illinois. The results indicate that soils with natric horizons at shallow depths or dark-colored poorly drained soils had

low levels of nitrate in the profile; all other soils showing increased nitrate levels in the entire profile or below the root zone were related to the amount of fertilizer used or the amount of animal activity. Animal operations resulted in larger amounts of nitrate in similar soil profiles than did fertilizer applications. Increased nitrate content of the ground water, sampled in Washington County, similarly was related to fertilizer practices and animal activity in all soils, except under soils with natric horizons at shallow depths. (Skogerboe-Colorado State)
W76-00836

FIELD TEST OF SOIL WATER FLUX METERS,
Agricultural Research Service, Riverside, Calif. Salinity Lab.
C. Dirksen.
Transactions of the ASAE, (American Society of Agricultural Engineers), Vol 17, No 6, p 1038-1042, November-December, 1974. 4 fig, 1 tab, 5 ref.

Descriptors: *Soil water, *Soil water movement, Soil properties, Soil tests, Tensiometers, Instrumentation, Measurement.
Identifiers: *Soil water flux meters.

An attempt was made to measure soil water fluxes directly in essentially undisturbed soil. This was accomplished by excavating access holes perpendicularly to the direction of flow with a specially disigned apparatus. Filter plates were pressed against undisturbed soil by a spring. Fluxes were measured by adjusting the overall hydraulic head loss across the meters, with a variable hydraulic resistance, to that in the soil nearby. Two flux meters gave realistic results that were generally in good agreement with each other. They reacted rapidly to different hydraulic resistance values consistent with earlier laboratory tests. This is in sharp contrast with an earlier attempt in which the access holes were dug by hand resulting in a complete failure. (Skogerboe-Colorado State)
W76-00838

POWDERED METAL PLATES FOR CONSTRUCTING UNSATURATED FLOW CELLS,
Agricultureal Research Service, Fresno, Calif. Water Management Research.
W. C. Bianchi.
Soil Science Society of American Proceedings, Vol 38, No 4, p 683-684, July-August, 1974. 3 fig, 1 tab, 4 ref.

Descriptors: *Unsaturated flow, Flow measurement, *Recharge, Groundwater movement, Moisture.
Identifiers: *Moisture flux.

Described is the theoretical design, construction and observed characteristics of sintered stainless steel powdered metal plates which could be used in control sections of an unsaturated flow cell. (Skogerboe-Colorado State)
W76-00840

WATER FLOW THROUGH MIXED CLAYS,
Birla Inst. of Tech. and Science, Pilani (India). Dept. of Chemistry.
R. C. Srivastava, A. K. Jain, and S. K. Upadhyay.
Journal of Hydrology, Vol. 26, No. 3/4, p 295-301, August 1975. 6 fig, 1 tab, 7 ref.

Descriptors: *Flow, *Clays, Kaolinite, Bentonite, Darcys law, Laboratory tests, Suspension, Equipment, Hydraulic conductivity, Compaction, Pressure, Density, Viscosity, Equations.
Identifiers: *Mass fractions, *Non-Newtonian index.

Water-flow measurements through mixtures of various compositions of kaolinite and bentonite clays were made. The data revealed an interrelationship among the hydraulic conductivity of the clay mixture, hydraulic conductivities of the constituent clays, and the composition of the mixtures. The mixtures up to the mass fraction 0.2 obeyed Darcy's law, while those of mass fraction 0.3 or greater did not. (Visocky-ISWS)
W76-00898

A DEPENDENT DOMAIN MODEL OF CAPILLARY HYSTERESIS,
Technion-Israel Inst. of Tech. Haifa. Faculty of Civil Engineering.
Y. Mualem, and G. Dagan.
Water Resources Research, Vol. 11, No. 3, p 452-460, June 1975. 15 fig, 7 ref, 2 append.

Descriptors: *Hysteresis, *Capillary water, *Capillary fringe, *Mathematical models, Model studies, Wetting, Drying, Soil moisture, Soil water, Hygroscopic water, Pores.
Identifiers: *Hysteretic loop, *Dependent domain model, Drying curves, Wetting scanning curves, Drying scanning curves, Wetting curves, Pore blockage.

A model of capillary hysteresis which takes into account the phenomenon of blockage against air (and water) entry was presented. The model was based on our previous (1974) model II, which predicts any hysteretic path with the aid of two functions, L(Psi) and H(Psi). The model was generalized by adding a new function of pore blockage against air (and a function of pore blockage against water), as has been suggested by D. H. Everett (1967) and G. C. Topp (1971). It was found that the function of pore blockage against water is of a lesser significance and can be neglected in most cases. A technique of deriving L(Psi), H(Psi), and the function of pore blockage against water from the measured boundary loop and one primary drying scanning curve was presented. A simple method of predicting any hysteretic path was suggested. It was found that the generalized model leads to better results than the models based on independent domain theories for soils having a major portion of their hysteretic loop in the range of air entry value. (Sanderson - ISWS)
W76-00903

IN SITU SOIL GAMMA ANALYZER--A NEW APPROACH TO DETERMINE THE MOVEMENT OF POLLUTANTS IN SOILS.
National Environmental Research Center, Las Vegas, Nev.
For primary bibliographic entry see Field 5A.
W76-00912

2H. Lakes

INTERNATIONAL FIELD YEAR FOR THE GREAT LAKES.
National Oceanic and Atmospheric Administration, Rockville, Md.
Available from the National Technical Information Service Springfield, Va 22161 as COM-74-10032. International Field Year for the Great Lakes (IFYGL) Bulletin No 8, October 1973. 78 p, 16 fig, 4 tab, 6 append.

Descriptors: *Great Lakes, *International waters, *International, Hydrological Decade, *Canada, *United States, Lake Ontario, Remote sensing, Water temperature, Surveys, Meteorological data, Programs, Publications, Currents(Water), Circulation, Evaporation, Meteorology, Solar radiation, Cloud cover, Wind velocity.
Identifiers: *International Field Year of the Great Lakes.

Three Canadian projects were reported: (1) High Altitude Remote Sensing Surveys of Lake Ontario, (2) Momentum, Heat and Moisture Transfer in the Atmospheric Surface Layer Over Lake Ontario, and (3) T-33 Airplane Investigations of the Boundary Layer. Data were presented for surface temperature, turbidity, and climatological data. Brief reports of U. S. scientific projects were included. U. S. publications were listed. (Humphreys-ISWS)
W76-00535

EFFECT OF WIND STRESS ON STRATIFIED DEEP LAKE,
Technical Univ. of Denmark, Lyngby. Inst. of Hydrodynamics and Hydraulic Engineering.
N-E. O. Hansen.
Journal of the Hydraulics Division, Proceedings of American Society of Civil Engineers, Vol 101, No HY8, Paper 11484, p 1037-1052, August 1975. 7 fig, 19 ref, append.

Descriptors: *Lakes, *Entrainment, *Stratified flow, *Mixing, Winds, Stratification, Velocity, Currents(Water), Dispersion, Diffusion, Density, Turbulence, Analysis, Hydraulics.
Identifiers: *Wind shear.

The basic equations for wind-driven flows in deep two-layered lakes were outlined. The deepening of the upper layer due to entrainment of more dense water from the lower layer were explained physically, and the entrainment was related to the wind shear stress at the water surface and an overall Richardson number. The general shapes of the distributions of shear stress and velocity were outlined. Diffusion and dispersion coefficients were calculated and related to the depth of the upper layer and to the wind shear stress at the surface. (Adams-ISWS)
W76-00551

THE THEORY OF WAVE PROPAGATION IN WATER OF GRADUALLY VARING DEPTH AND THE PREDICTION OF BREAKER TYPE AND HEIGHT,
Oregon State Univ., Corvallis. School of Oceanography.
For primary bibliographic entry see Field 2L.
W76-00557

FORMATION AND DEVELOPMENT OF LAND-AQUATIC VEGETATION IN SHALLOW WATERS OF THE DNIEPER, PRIPYAT AND TETEREV FLORA PLAINS (IN UKRAINIAN),
Akademiya Nauk URSR, Kiev. Instytut Botaniki.
For primary bibliographic entry see Field 2I.
W76-00582

GREEN BAY SELF-PURIFIES ALGAL NUTRIENTS,
Wisconsin Univ., Madison.
For primary bibliographic entry see Field 5C.
W76-00615

MAN'S ACCELERATION OF HYDROGEOCHEMICAL CYCLING OF PHOSPHORUS: EUTROPHICATION OF INLAND AND COASTAL WATERS,
Eidgenoessische Technische Hochschule, Zurich (Switzerland).
For primary bibliographic entry see Field 5C.
W76-00620

HYDROLOGY OF THE LAKE WINGRA BASIN, DANE COUNTY, WISCONSIN.
Geological Survey, Madison, Wis.
E. L. Oakes, G. E. Hendrickson, and E. E. Zuehls.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-245 626, $3.75 in printed copy, $2.25 i microfiche. Water-Resources Investigations, 17-75, July 1975. 31 p, 5 fig, 1 plate, 10 tab, 8 ref.

Descriptors: *Hydrologic budget, *Lakes, *Wisconsin, *Hydrology, *Hydrologic data, Inflow, Discharge(Water), Water storage, Runoff, Groundwater movement, Surface waters,

Evaporation, Precipitation(Atmospheric), Evapotranspiration.
Identifiers: *Lake Wingra basin(Wis).

A water budget was prepared to identify the components of the hydrologic system in the Lake Wingra basin, Wisconsin. The Lake Wingra basin, which includes a small eutrophic lake within the city of Madison is partly a protected area and parly an urbanized area. Measured and estimated inflow and outflow to and from the lake in 1 year (June 1972 and May 1973) was about 4.5 metres (15 feet)--approximately twice the volume of the lake. Inflow to the lake is about 25 percent from direct precipitation on the lake surface, and the rest from nearly equal amounts of surface runoff and groundwater inflow. Outflow from the lake is about 10 percent groundwater outflow, 15 percent evaporation from the lake surface, and 75 percent discharge at the surface outlet. Increased withdrawal of water from municipal and industrial wells in Madison has slowed the rate of flow through the lake. The calculated 1972 water budget for the lake showed gains of about 3,560 millimetres (140 in.) and losses of about 3,500 millimetres (138 in.). A discrepancy of about 60 millimetres (2 in.) probably was caused in part by uncertainties in groundwater inflow and outflow and by evapotranspiration and groundwater inflow in the marsh area southwest of the lake. (Woodard-USGS)
W76-00667

THE EFFECT AND FATE OF CRUDE OIL SPILT ON TWO ARCTIC LAKES,
Fisheries Research Board of Canada, Winnipeg (Manitaba). Freshwater Inst.
For primary bibliographic entry see Field 5C.
W76-00863

IN SITU COLOUR MEASUREMENTS ON THE GREAT LAKES,
Canada Centre for Inland Waters, Burlington(Ontario).
For primary bibliographic entry see Field 5A.
W76-00885

PROPERTY--CLASSIFYING BODIES OF WATER AS LAKES OR STREAMS,
For primary bibliographic entry see Field 2E.
W76-00931

ON THE CONCEPT OF LAKE STABILITY,
Agricultural Research Service, Phoenix, Ariz. Water Conservation Lab.
S. B. Idso.
Limnol Oceanogr, Vol 18, No 4, p 681-683, 1973.

Descriptors: *Lakes, Stability.

A new equation describing the stability of a lake, as conceptually defined by Schmidt, is developed to supply information on the contribution of each lake layer to stability. It is analogous in form to the expression derived by Birge for his concept of direct work of the wind and may be combined with that to yield a curve for direct total work as a function of lake depth.--Copyright 1974, Biological Abstracts, Inc.
W76-00990

THE INFLUENCE OF FISH ON THE DISTRIBUTION OF CHAOBORUS SPP. (DIPTERA) AND DENSITY OF LARVAE IN THE MATAMEK RIVER SYSTEM, QUEBEC,
Waterloo Univ. (Ontario). Dept. of Biology.
G. F. Pope, J. C. H. Carter, and G. Power.
Trans Am Fish Soc, Vol 102, No 4, p 707-714, 1973, Illus.

Descriptors: *Lakes, *Fish food organisms, Diptera, Canada.
Identifiers: Chaoborus, Matamek River(Quebec), Scandanophasma.

The distribution and limnetic density of 5 spp. of Chaoborus larvae were determined in 26 lakes of the Matamek River System, Quebec, Canada. The distribution of C. Americanus is closely related to the absence of fish while C. punctipennis is associated with fish populations. The distributions of C. trivittatus and C. flavicans appear independent of the presence of fish, but C. flavicans reaches its greatest density in the 3 lakes with the largest basins. A probable new species or subspecies of the subgenus Scadanophasma was found in 3 lakes. The standing crop of limnetic Chaoborus larvae is higher in lakes without fish than with fish.--Copyright 1974, Biological Abstracts, Inc.
W76-00993

DEEP WATER WAVES IN LAKES,
Nature Conservancy, Edinburgh (Scotland).
I. R. Smith, and I. J. Sinclair.
Freshwater Biol, Vol 2, No 4, p 387-399, 1972, Illus.

Descriptors: *Waves(Water), *Lakes.

The properties of waves on a lake surface and the influence of water depth on these properties are discussed. The method, derived by the Beach Erosion Board, of predicting wave characteristics if the wind speed and fetch are known is outlined and the validity of the method in Loch Leven, Scotland, is confirmed. This prediction technique is then combined with the equations of classical hydrodynamics to form a method of assessing the nature and extent of wave action in lakes without direct measurement. The value of the ratio of the wave-mixed volume to the total lake volume as a measure of hydraulic conditions in lakes is suggested.--Copyright 1973, Biological Abstracts, Inc.
W76-01000

2I. Water In Plants

THE ROACH (RUTILUS RUTILUS L.) FROM THE DAM RESERVOIR IN PRZECZYCE, POLAND,
Polish Academy of Sciences, Krakow. Zaklad Biologii Wod.
S. Skora.
Acta Hydrobiol, Vol 14, No 4, p 399-418, Illus, 1972.

Descriptors: *Algae, Reservoirs, *Fertility, Aquatic insects, *Fish food organisms, Fish, Larvae.
Identifiers: *Poland(Przeczyce), *Roach, Rutilus-rutilus.

The body length, body weight, growth, age, variability of 30 morphological features of the body, variability of meristic features and fertility of 205 specimens of the roach from the dam reservoir in Przeczyce (Poland) were examined. The contents of the alimentary canal of this fish were analyzed. The growth of the examined fish, in comparison with that of this species in other reservoirs, was considered fair. A decrease and equalization of relative variability of morphological features is similar to that in other fish. Meristic features did not deviate from the standard adopted for the roach. Individual variations of fertility of females were considerable and ranged from 12,480--334,464 eggs/female. Larvae of insects and filamentous algae constituted the main components of the content of the alimentary canal of the roach.--Copyright 1974, Biological Abstracts, Inc.
W76-00556

WATER REGIMEN OF SOME LEAF-BEARING EVERGREENS IN CONNECTION WITH THEIR OVERWINTERING AT THE BATUMI BOTANICAL GARDEN, (IN RUSSIAN),
N. M. Sharashidze.
Izv Batum Bot Sad Akad Nauk Gruz SSR, No 17, p 56-70. 1972.

Descriptors: Frost, *Leaves, Winter, Seasonal.
Identifiers: Botanical gardens, *Evergreens, *USSR, *Frost resistance(Evergreens).

The water status was studied of leaves of evergreens varying in geographic origin, ecological type, and frost resistance. The minimum content of total water was noted in the spring. In the summer the content of total water increased, but again decreased toward winter. At the end of spring the minimum content of bound water was found in the leaves. During the fall and winter the content of bound water increased. A direct correlation was not observed between the quantity of bound water and frost resistance when plants of different geographic origin were compared. Although the curves of the change of the content of bound water is nonuniform, during the winter the leaves contained less bound water than during the summer. It is concluded that an increase of the content of bound water in the winter promotes an increase of frost resistance--Copyright 1974, Biological Abstracts, Inc.
W76-00568

AN ELECTRONIC LEAF WETNESS RECORDER,
Agricultural Univ., Wageningen (Netherlands). Stichting Technische en Fysische Dienst voor de Landbouw.
K. Schurer, and A. F. Van Der Wal.
Neth J Plant Pathol. Vol 78, No 1, p 29-32. 1972. Illus.

Descriptors: *Leaves, *Plant diseases, Fungi, *Moisture content, *Measurement, *Instrumentation, Electronic equipment.
Identifiers: Wetness.

Leaf wetness recording is important in epidemiological studies of plant diseases caused by fungi. An insturment was constructed which is capable of deriving the wetness signal directly from leaves and producing a DC output at a level compatible with other signals to be recorded simultaneously. The recorder measures the electrical conductivity between a pair of electrodes placed on the leaf. The circuit diagram is shown. A field test conducted with the recorder proved successful. Wetness due to rain and dew was recorded.--Copyright 1974, Biological Abstracts, Inc.
W76-00569

A FLEXIBLE APPARATUS FOR CONTINUOUS RECORDING OF WATER UPTAKE BY PLANTS,
Lund Inst. of Tech. (Sweden). Dept. of Electrical Measurements.
T. Brogardh, and A. Johnsson.
Med Biol Eng. Vol 11, No 3, p 286-292. 1973 Illus.

Descriptors: *Instrumentation, *Root systems, *Water utilization, *Measurement.
Identifiers: *Apparatus, *Plants, *Water uptake.

An apparatus for the continuous and automatic recording of water uptake by small plants or single shoots is described. The root system of the plant (Or plants) to be investigated is submerged in a water supply vessel. The water decrease in the vessel is detected, and the water is replaced by pumping new water into the vessel in a stepwise fashion. The apparatus can be used for measuring the total amount of water taken up, and the rate of water uptake. A water uptake of less than 0.1 mm3 can be reliably determined in the present applications. An example from measurements of cyclic uptake of water by one single oat plant is given. --Copyright 1974, Biological Abstracts, Inc.
W76-00571

ANNUAL CYCLE OF MAYFLIES (EPHEMEROPTERA) IN A KARSTIC STREAM,
Vysoka Skola Zemedelska, Lednice (Czechoslovakia). Hydrobiological Station.

Ivo. Sukop.
Acta Entomol Bohemoslov. Vol 70, No 2, p 81-85. 1973.

Descriptors: *Mayflies, *Biocass, Insects, *Streams, Europe.
Identifiers: Czechoslovakia, Ephemeroptera, Karstic streams, Trout streams.

The annual changes in the abundance and biomass of mayflies (Ephemeroptera) were investigated at 2 stations on a karstic stream with a stony bottom. The number of species observed corresponded to that given by other authors for Moravian (Czechoslovakia) trout streams. The annual average of abundance and biomass did not differ significantly from data published for Moravian trout streams. The total quantity of mayflies resulted significantly from the occurrence of a few species; the others occurred sporadically only and did not show a significant effect on total quantitative values. Developmental cycles of the most frequent mayfly species found in the Krtiny river corresponded to data concerning development cycles of mid-European mayfly species. The highest values of the mayfly biomass were found during spring months when larvae of the most frequent species of the Krtiny river matured.--Copyright 1974, Biological Abstracts, Inc.
W76-00575

FORMATION AND DEVELOPMENT OF LAND-AQUATIC VEGETATION IN SHALLOW WATERS OF THE DNIEPER, PRIPYAT AND TETEREV FLORA PLAINS (IN UKRAINIAN),
Akademiya Nauk URSR, Kiev. Instytut Botaniki.
D. Ya. Afanas'yev.
Ukr Bot Zh. Vol 30, No 1, p 96-103, 1973. Illus. (English summary).

Descriptors: *Reservoirs, *Aquatic plants, *Plant growth, Europe, Shallow water.
Identifiers: Agrostis-Stolonizans, Alisma-Plantago-Aquatica, Butomus-Umbellatus, Dnieper, Eleocharis-Palustris, Glyceria-Aquatica, Phragmites-Communis, Pripyat, Schoenoplectus-Lacustris, Sparganium-Polydrum, Teterev, Typha-Angustifolia, Typha-Latifolia, USSR.

Evidence is presented on the Kiev (USSR) reservoir character and initial vegetation that existed before its filling. The factors determining the ways of formation and development of groupings of the land-aquatic vegetation in shallow waters are discussed. Productivity of groupings of land-aquatic vegetation and the factors affecting its variation are indicated. Prognosis of vegetation development in shallow waters is given for the early phase. Species discussed are: Agrostis stolonizans, Glyceria aquatica, Butomus umbellatus, Sparganium polydrum, Alisma plantago-aquatica, Typha latifolia, T. angustifolia, Schoenoplectus lacustris, Phragmites communis and Eleocharis palustris.--Copyright (c) 1974, Biological Abstracts, Inc.
W76-00582

RAINFALL MEASUREMENTS ABOVE AND IN THE CANOPY OF A MIXED OAK FOREST,
Brussels Univ. (Belgium). Laboratoire de Botanique Systematique et d'Ecologie.
For primary bibliographic entry see Field 2B.
W76-00583

PHYTOPLANKTON AND EUTROPHICATION IN SOME LAKES IN VESTFOLD, SOUTH NORWAY,
Oslo Univ. (Norway). Inst. of Marine Biology; and Oslo Univ. (Norway). Dept. of Limnology.
For primary bibliographic entry see Field 5C.
W76-00613

ECOLOGY OF THE LAKE FROG IN SOUTH-EASTERN KAZAKHSTAN. (IN RUSSIAN).
Akademiya Nauk Kazakhskoi SSR, Alma-Ata. Institut Zoologii.
Izv Akad Nauk Kaz SSR Ser Biol. 1. p 52-57. 1973.

Descriptors: *Frogs, Amphibians, Wildlife, Animal growth, *Animal behavior, Lakes.
Identifiers: Ecology, Frog, Hibernation, Kazakhstan, Rana-ridibunda, USSR, Ili River.

Naturalistic observations of Rana ridibunda in the Ili River and Alma-Ata in 1968-1969 were compared with data obtained in other regions of southeastern Kazakhstan in 1952-1962. The lake frog propagates and develops in the low temperature regime of artificial reservoirs in this region, and this permits extension of its area of distribution from the south-east to the north-east. Adaptation of the southern species to marked temperature fluctuations permits tadpoles to hibernate at an early age in cold waters. Adult specimens eat mainly insects; harmful insects with larvae account fo 42%. Vertebrates account for 1-3%. R. ridibunda may be considered a useful species in south-eastern Kazakhstan.--Copyright 1974, Biological Abstracts, Inc.
W76-00637

DISCOVERY OF THE GASTROPOD SNAIL MELANOIDES (THIARA) TUBERCULATA (MULLER) IN FLORIDA,
Geological Survey, Miami, Fla.
For primary bibliographic entry see Field 5B.
W76-00660

EVAPOTRANSPIRATION,
Forest Service (USDA), Durham, N.H. Northeastern Forest Experiment Station.
For primary bibliographic entry see Field 2D.
W76-00702

INFLUENCE OF SOIL-WATER POTENTIAL ON THE WATER RELATIONSHIPS OF HONEY MESQUITE,
Texas State Technical Institute, Amarillo.
For primary bibliographic entry see Field 2D.
W76-00703

PHYSIOLOGICAL RESPONSES OF SEMIARID GRASSES. III: GROWTH IN RELATION TO TEMPERATURE AND SOIL WATER DEFICIT,
Charleville Pastoral Lab. (Australia).
E. K. Christie.
Australian Journal of Agricultural Research, Vol 26, No 3, p 447-457, May, 1975. 8 fig, 4 tab, 21 ref.

Descriptors: *Grasses, *Semiarid climates, *Growth rates, *Plant physiology, *Moisture stress, Plant growth, Plant growth substances, Productivity, Soil-water-plant relationships, Water requirements, Air temperature, Soil moisture, Moisture availability, Phosphorus, Nutrients.
Identifiers: Mulga grass(Thyridolepis mitchelliana), Hoop Mitchell grass(Astrebla elymoides), Buffel grass(Cenchrus ciliaris L.).

The effects of temperature and soil water supply on mulga grass (Thyridolepis mitchelliana (Ness) S. T. Blake), hoop Mitchell grass (Astrebla elymoides F. Muell.ex F. M. Bailey) and buffel grass (Cenchrus ciliaris L.) are discussed. The optimum temperature for growth was about 25C for mulga grass, and 30C for Mitchell and buffel grass. Buffel grass had the highest yield at all temperatures which is attributed to its higher growth rate, higher assimilation rate and the diversion of a greater proportion of dry weight into leaf area. Seedlings with an adequate supply of phosphate had higher relative growth rates than phosphorus-deficient seedlings at the commencement of the soil drying cycle, but their growth rates declined more rapidly as soil water potential fell. This was associated with a reduction in the rate of phosphate absorption as well as a decrease in tissue phosphorus concentration. (Robinett-Arizona)
W76-00704

WATER POTENTIALS OF SALSOLA KALI L. AT DIFFERING LEVELS OF SUBSTRATE WATER AVAILABILITY,
Forest Service (USDA), Odgen, Utah. Intermountain Forest and Range Experiment Station.
W. T. McDonough.
Plant and Soil, Vol 42, No 2, p 387-393, April, 1975. 3 fig, 7 ref.

Descriptors: *Plant physiology, *Germination, *Plant growth, *Water requirements, *Turgidity, Growth stages, Moisture stress, Plant growth, Water balance, Moisture availability, Moisture uptake, Osmotic pressure, Hygrometry, Moisture content, Root development, Plant tissues, Weeds, *Utah.
Identifiers: Water potential, *Russian thistle(Salsola Kali L.), Wasatch Range(Utah).

Isolated embryos of Salsola Kali L. (Russian thistle) were allowed to imbibe on filter paper in Peltier thermocouple psychrometer chambers with differing amounts of water available. Water potential determinations made on the system periodically during the 24 hour period of imbibition showed that at the 24th hour, complete extension of the embryonic axis occurred at an equilibrium water potential of -2 bars and an embryo water content of 114%, perceptible growth (uncoiling of the spiraled embryo) at -30 bars and 83%, and no growth or perceptible swelling at -54 bars and 56%. In Salsola, evidence of growth occurs at water potentials well below those that permit germination in other species investigated, and extensive growth occurs in about the same range as root protrusion in the other species investigated. Hourly monitoring of the water potential of the plant-substrate system showed an initial rise toward a level that would be attained by the wetted filtered paper alone and then a decline to lower water potential values at intermediate levels of water availability. This reversal is ascribed to the increasing effects of the osmotic and matric components of the total water potential of the plant tissue during imbibition and growth. (Robinett-Arizona)
W76-00705

RESPONSE TO THREE SEMIDWARF MEXICAN WHEATS TO DIFFERENT AERATION CONDITIONS IN THE ROOTING MEDIUM AT A CONSTANT SALINITY LEVEL,
Escuela Nacional de Agricultura Chapingo (Mexico).
For primary bibliographic entry see Field 3C.
W76-00710

BIOLOGICAL PRODUCTIVITY OF HERBACEOUS PHYTOCENOSES OF THE AMU DAR'YA FLOOD LANDS. (IN RUSSIAN),
Akademiya Nauk Turkmenskoi SSR, Ashkhabad. Institut Botaniki.
A. I. Gladyshev.
Izv Akad Nauk Turkm SSR ser Biol Nauk. 2 p 38-45, 1973. Illus. (English summary).

Descriptors: *Flood plains, *Plant growth.
Identifiers: Amu-Darya River, *Phytocenoses, USSR.

Perennial herbaceous plants, determining the structure of vegetational cover of the Amu Dar'ya (USSR) middle stream flood lands, can accumulate exclusively high phytomass (From 7.7-121.9t/ha dry matter); total stock of the organic matter reaches 138.8t/ha.--Copyright 1974, Biological Abstracts, Inc.
W76-00711

DROUGHT TOLERANCE OF PINE SEEDLINGS UNDER VARIOUS CLIMATIC CONDITIONS,
Agricultural Research Organization, Dor (Israel). Div. of Forestry.
D. Heth, and P. J. Kramer.
Forest Science, Vol 21, No 1, p 72-82, March, 1975. 5 fig, 5 tab, 25 ref.

Descriptors: *Osmotic pressure, *Moisture stress, *Plant physiology, *Pine trees, *Plant growth, Leaves, Drying, Turgidity, Moisture availability, Transpiration, Droughts, Arid lands, Loblolly pine trees, Planting management, Temperature, Thermal stress, Humidity, Soil moisture, Soil-water-plant relationships.
Identifiers: Shortleaf pine(Pinus echinata), Monterey pine(Pinus radiata D. Don), Pinus taeda L.

The ability to avoid severe desiccation during periods of increasing soil moisture stress is critical for survival of drought by pine seedlings. Tolerance of water stress by seedlings was evaluated under 4 combinations of temperature and humidity in controlled environment chambers. The survival ability of seedlings after cessation of watering was strongly related to temperature and humidity; survival being highest in the most cool environment and lowest in the hot dry environment. Soil water potential at seedling death was lowest for Monterey pine (Pinus radiata D. Don) in all 4 environments and lowest in the moist cool environments. Soil water potential at seedling death was lowest for shortleaf pine (P. echinata) and loblolly pine (P. taeda L.) in the moist warm environment. Monterey pine appeared to be most drought tolerant as measured by soil water potential at seedling death in all but the moist warm environment in which there was little difference among the 3 species. (Robinett-Arizona)
W76-00712

THE VALUE OF VEGETATION FOR CONSERVATION I. FOUR LAND AREAS IN BRITAIN,
Nature Conservancy, Grange-over-Sands (England). Merlewood Research Station.
D. R. Helliwell.
Journal of Environmental Management, Vol 2, No 1, p 51-74, January 1974. 1 fig, 4 tab, 5 ref, append.

Descriptors: *Vegetation effects, *Vegetation, Conservation, *Plant populations.
Identifiers: *England.

Lists of plant species and their relative frequency have been used, in conjunction with the 'Atlas of the British Flora', to compare the conservation 'value' of the vegetation on four different areas of land in Britain. A wide range of assumptions as to the weighting to be given to the rarity of species gives very similar results in each case. (See also W76-00737) (Skogerboe-Colorado State)
W76-00736

THE VALUE OF VEGETATION FOR CONSERVATION II. M1 MOTORWAY AREA,
Nature Conservancy, Grange-over-Sands (England). Merlewood Research Station.
D. R. Helliwell.
Journal of Environmental Management, Vol 2, No 1, p 75-78, January 1974. 1 fig, 1 ref.

Descriptors: *Vegetation effects, *Vegetation, Conservation, *Plant populations.
Identifiers: *England.

A list of plant species occuring along 175 miles (282 km) of motorway embankment has been used in an attempt to compare the conservation 'value' of this vegetation with four other areas of vegetation, but it is concluded that such a comparison is not possible. (See also W76-00736) (Skogerboe-Colorado State)
W76-00737

INCREASING INTENSIFICATION OF PLANT PRODUCTION AND THE PROBLEM OF CHANGES IN THE NATURAL ENVIRONMENT,
Polish Academy of Sciences, Warsaw. Inst. on Agricultural and Forestry Economics.
For primary bibliographic entry see Field 5B.
W76-00766

DROUGHT-STRESS AVOIDANCE IN THREE PIONEER TREE SPECIES,
Union Coll., Schenectacy, N. Y. Dept. of Biology.
T. M. Kana, and P. Tobiessen.
Ecology, Vol 55, No 3, p 667-670, 1974. Illus.

Descriptors: *Stomata, *Water loss, Drought, Tolerance.
Identifiers: Fraxinus Americana, Populus Grandidentata, Populus Tremuloides.

Leaf resistance to water vapor flow was determined relative to leaf-water potential for white ash, quaking aspen, and bigtooth aspen (Fraxinus americana, Populus tremuloides, P. grandidentata). Ash leaves were found to close their stomata at approximately -20 bars and bigtooth aspen leaves at approximately -30 bars, whereas quaking aspen maintained low leaf resistance to -60 bars. This lack of control of water loss is suggested as a possible reason for the apparent moist site preference for quaking aspen in the study region. Bigtooth aspen may be able to survive in more xeric habitats than ash because of the latter's high leaf-water potential for stomatal closure.--Copyright 1974, Biological Abstracts, Inc.
W76-00872

PATHOLOGICAL CHANGES OBSERVED IN FISHES FOLLOWING POISONING BY GRANULATED HERBICIDES-ATRAZINE AND DIURON: RAPID DETERMINATION OF THE TOXICITY OF LOW PESTICIDE CONCENTRATIONS (IN RUSSIAN),
K. R. Martino.
Tr Kasp Nauchno-Issled Inst Rybn Khoz, 26, p 245-249, 1971.

Descriptors: *Fish, Pesticides, *Fishkill, *Herbicides, Diseases, Fish diseases, *Pesticide toxicity.
Identifiers: Atrazine, Diuron, Granulation herbicides, Liver, Rudd, Scardinius-erythrophthalmus, Necrosis.

The effect of low concentrations of the granulated herbicides atrazine and diuron on the rud (Scardinius erythrophthalmus) was studied. The experiments were set up under aquarium conditions using fish in the IV and V stages of maturity. Change of behavioral sterotypes were determined on the basis of 4 indices: defense reflex, response to food, localization of the fish in the bottom or surface waters, and presence or absense of the schooling instinct. At the end of 8-9 days the fish were subjected to hematological and pathohistological investigations. At the minimum tested concentrations of atrazine and diuron (0.64 mg/l) the behavior of the experimental fish did not differ from that in controls. However, destruction of erythrocytes was noted in the blood and edema and cloudy swelling progressing to necrosis were observed in the liver. The experiments demonstrated the unsuitability of these herbicides for fish farms and the possibility of rapid determination of the toxicity of various pesticides.--Copyright 1974, Biological Abstracts, Inc.
W76-00995

SOME EFFECTS OF SOIL TYPE AND WATER REGIME ON GROWTH OF TUPELO SEEDLINGS,
Forest Service (USDA), Charleston, S.C. Southeastern Forest Experiment Station.
W. R. Harms.
Ecology, Vol 54, No 1, p 188-193, 1973, Illus.

Descriptors: *Soil-water-plant relationships, Soil water, Plant growth, Stagnant water.
Identifiers: Nyssa- aquatica, Nyssa sylvatica, Tupelo, Tree seedlings.

Two-year-old swamp tupelo (Nyssa sylvatica var. biflora (Walt.) Sarg.) and water tupelo (N. aquatica L.) grown in large tanks in a silty clay loam soil from a river swamp or a sandy loam soil from a non-aliuvial headwater swamp were subjected to continuous flooding at depths of 20 cm above the soil surface with moving water, 20 cm above the soil surface with stagnant water, or at the soil surface with moving water. Height growth of water tupelo averaged 1.8 times greater and dry weight 2 to 3 times greater in the more fertile soil from the river swamp than in soil from the headwater swamp. Soil type had no effect on growth of swamp tupelo. Growth and dry weight of both tupelos were poorest in the regime with stagnant water, which also had the highest CO2 and lowest O2 contents. Swamp tupelo grew 50 cm more in height in the surface-flooded regime with moving water than in either deep-flooded regime. Water tupelo in both regimes with moving water grew 37 cm taller than those in the stagnant regime.--Copyright 1973, Biological Abstracts, Inc.
W76-00999

2J. Erosion and Sedimentation

A DUAL-INTERVAL, LIGHT-ACTIVATED SIGNAL GENERATOR--ITS APPLICATION TO SEDIMENT SAMPLING,
Agricultural Research Service, Chickasha, Okla.
C. D. Edens, and D. G. DeCoursey.
Transactions of the American Society of Agricultural Engineers, Vol 18, No 3, p 505-507, May-June 1975. 4 fig, 1 tab.

Descriptors: *Instrumentation, *Sediments, *Sampling, Measurement, Data collections, Hydrologic data, Water table, Electronic equipment, Water levels.
Identifiers: Optical instruments, Light-activated devices, Signal generator.

Since records of sediment in the field are not available on a continuous basis, water samples must be collected periodically and analyzed for concentration. The device described was less expensive improvement over available stage and time-activated methods of determining when samples should be taken. To signal the sampler, the device uses light-sensitive rectifiers, activated by light shining through the holes in a disc mounted on the stage recorder. (Lee-ISWS)
W76-00543

EROSION IN THE URBAN ENVIRONMENT,
Johns Hopkins Univ., Baltimore, Md.
M. G. Wolman.
Hydrologic Sciences Bulletin, Vol 20, No 1, p 117-125, March 1975. 1 tab, 17 ref.

Descriptors: *Erosion, *Erosion rates, *Urbanization, *Sedimentation, Urban runoff, Rill erosion, Sheet erosion, Soil erosion, Channel erosion, Sediment load, Water quality, Turbidity, Erosion control, Sediment yield, Construction, Urban hydrology, Environmental effects, Land development.

Urbanization and accompanying construction increase erosion rates from five to 200 times or more in the eastern United States. Sediment yields in streams increase by comparable amounts. Data from the United Kingdom, Japan, Canada, and Mexico suggest roughly similar ranges. Increased discharge from urban areas combined with increases in sediment concentration on the order of 2 to 50-fold are demonstrated in individual storms and in seasonal and annual variations in the United Kingdom. Potential for erosion below dams parallels a similar potential from urbanized areas after

construction. Nomograms relating area under construction, basin area, and erosion rates provide useful tools for management. Additional information is needed on sediment transport by storm rainfalls of varying frequency and magnitude, on accumulation and movement of sediment in channels and recovery of stream biota, and on channel enlargement resulting from urbanization. (Terstriep-ISWS)
W76-00546

DEPOSITION RATES IN VALLEYS DETERMINED USING FALLOUT CESIUM-137,
Agricultural Research Service, Oxford, Miss. Sedimentation Lab.
J. C. Ritchie, P. H. Hawks, and J. R. McHenry.
Geological Society of America Bulletin, Vol 86, No 8, p 1128-1130, August 1975. 4 fig, 1 tab, 24 ref. ERDA AT-(49-7)-3029.

Descriptors: *Sedimentation rates, *Radioactivity techniques, *Mississippi, Fluvial sediments, Deposition(Sediments), Sediment transport, Fallout, Alluvium, Cesium Radioisotopes, Valleys, Measurement, Data collections.
Identifiers: *Cesium-137, Geochronology.

Many of man's cultural activities have accelerated the deposition of sediment in valleys, yet in most places these rates are low and difficult to measure. Sediment profiles collected in northern Mississippi had a range of deposition rates from 0.9 to 6.5 cm/yr as determined using fallout cesium-137. These deposition rates were similar to rates determined along these same ranges using survey techniques. (Lee-ISWS)
W76-00547

EDGE WAVES AND BEACH CUSPS,
Scripps Institution of Oceanography, La Jolla, Calif.
For primary bibliographic entry see Field 2L.
W76-00558

A HYDROLOGIC ASSESSMENT OF THE SEPTEMBER 14, 1974, FLOOD IN ELDORADO CANYON, NEVADA.
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 2E.
W76-00663

DISTRIBUTION OF RADIONUCLIDES IN THE COLUMBIA RIVER STREAMBED, HANFORD RESERVATION TO LONGVIEW, WASHINGTON,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 5B.
W76-00664

INTERSTITIAL WATER STUDIES ON SMALL CORE SAMPLES, LEG 22,
Geological Survey, Woods Hole, Mass.
For primary bibliographic entry see Field 2L.
W76-00665

NUTRIENT EXCHANGE IN WATER-SEDIMENT INTERFACE AND ITS EFFECTS ON WATER QUALITY,
Rhode Island Univ., Kingston. Dept. of Civil and Environmental Engineering.
For primary bibliographic entry see Field 5C.
W76-00715

AN AUTOMATIC PUMPING SAMPLER FOR EVALUATING THE TRANSPORT OF PESTICIDES IN SUSPENDED SEDIMENT,
For primary bibliographic entry see Field 5B.
W76-00728

MAGIC ISLAND...TEN YEARS AFTER,
Belt, Collins and Associates Ltd., Honolulu, Hawaii.
For primary bibliographic entry see Field 8A.
W76-00889

VOLUMETRIC CHANGES IN BEACH PROFILES,
Glamorgan Polytechnic, Pontypridd(Wales).
For primary bibliographic entry see Field 2L.
W76-00890

LAKE STREAM CONTRVERSY: A FINAL DECISION,
For primary bibliographic entry see Field 6E.
W76-00927

DEPARTMENT OF NATURAL RESOURCES V MAYOR AND COUNCIL OF OCEAN CITY (ACTION BY OWNER OF LAND TO REAR OF OCEAN FRONT TRACT TO ENJOIN CONSTRUCTION OF CONDOMINIUM).
For primary bibliographic entry see Field 6G.
W76-00936

MAJOR FLOODS, POOR LAND USE DELAY RETURN OF SEDIMENTATION TO NORMAL RATES,
Forest Service (USDA), Berkely, Calif. Pacific Southwest Forest and Range Experiment Station.
For primary bibliographic entry see Field 4D.
W76-00989

2K. Chemical Processes

THE EFFECTS OF STREAM CHANNELIZATION OF THE DISTRIBUTION OF NITRIENTS AND METALS,
East Carolina Univ., Greenville, N.C. Dept. of Biology.
For primary bibliographic entry see Field 5B.
W76-00501

ALKALINITY CALCULATIONS IN WATER,
Kiriat-Yam 'G', Haifa (Israel).
A. Zonker.
Water and Sewage Works, Reference Number, p R162-R163, April 30, 1975. Revised by H. G. Swope. 1 fig, 1 tab, 1 ref.

Descriptors: *Analytical techniques, *Water analysis, *Alkalinity, Chemical analysis, Bicarbonates, Carbonates, Alkalis(Bases), *Volumetric analysis, Pollutant identification.
Identifiers: Nomagraphs.

The simple, classical method of alkalinity determination in water is based on double titration with acid. Phenolphthalein and methyl orange are used to indicate the titration end points. A well known table of values may be obtained by using 100 ml of water an 0.02N acid as a titrant, and determining P as the quantity of acid consumed from the beginning to the phenolphthalein end point, and T as the quantity of acid consumed from he beginning to the methyl orange end point. A nomograph is presented which includes these possibilities. By connecting the known values of P and T, one can determine the concentration of hydroxides, carbonates, and bicarbonates. Several examples are give. Since the nomograph is based on a 100 ml sample and 0.0200N acid, care must be taken to insure that the test acid has the exact normality and corrections must be made for samples of less than or more than 100 ml. (Orr-FIRL)
W76-00599

GROUND-WATER QUALITY IN INDIAN WELLS VALLEY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 5A.
W76-00658

SUMMARY APPRAISALS OF THE NATION'S GROUND-WATER RESOURCES-UPPER COLORADO REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 2F.
W76-00662

INTERSTITIAL WATER STUDIES ON SMALL CORE SAMPLES, LEG 22,
Geological Survey, Woods Hole, Mass.
For primary bibliographic entry see Field 2L.
W76-00665

MAP SHOWING AVAILABILITY OF HYDROLOGIC DATA PUBLISHED AS OF 1974 BY THE U.S. ENVIRONMENTAL DATA SERVICE AND BY THE U.S. GEOLOGICAL SURVEY AND COOPERATING AGENCIES, COLORADO SPRINGS-CASTLE ROCK AREA, FRONT RANGE URBAN CORRIDOR, COLORADO,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 7C.
W76-00669

A SURVEY OF THE BORON CONTENT OF CERTAIN WATERS OF THE GREATER LONDON AREA USING A NOVEL ANALYTICAL METHOD,
Anglian Water Authority, Huntingdon (England). Directorate of Scientific Services.
For primary bibliographic entry see Field 5A.
W76-00727

ENVIRONMENTAL ISOTOPIC STUDY OF THE BARREMIAN-JURASSIC AQUIFER IN SOUTH DOBROGEA (ROUMANIA),
Institutul de Meteorologie si Hidrologie, Bucharest (Rumania).
For primary bibliographic entry see Field 2F.
W76-00894

OCCURRENCE AND DISTRIBUTION OF POTASSIUM IONS IN NATURAL WATERS IN INDIA,
Soil Research Lab., Chandigarh (India).
For primary bibliographic entry see Field 5B.
W76-00897

PRECIPITATION: ITS ACIDIC NATURE,
Pittsburg Univ., Pa. Dept. of Occupational Health.
J. O. Frohliger, and R. Kane.
Science, Vol. 189, No. 4201, p 455-457, August 8, 1975. 2 tab, 5 ref.

Descriptors: *Chemistry of precipitation, *Precipitation(Atmospheric), *Acidity, *Pennsylvania, Chemistry, Rain, Snow, Acids, Chemical analysis, Water chemistry, Hydrogen ion concentration, Sampling, Pollutant identification.

A comparison of the free hydrogen ion concentration and the total hydrogen ion concentration of rain samples showed that rain is a weak acid. The weak acid nature of rain casts doubt on the concepts that the acidity of rain is increasing and that these increases are due to strong acids such as sulfuric acid. (Sims-ISWS)
W76-00900

2L. Estuaries

AN OCEANOGRAPHIC RESEARCH PROGRAM FOR THE CONTINENTAL SHELF OFF THE SOUTHEASTERN UNITED STATES.
Division of Biomedical and Environmental Research (USERDA), Washington, D.C.

Available from the National Technical Information Service, Springfield Va 22161. ERDA-12, Proceedings of the Workshop, Savannah River Laboratory, Aiken, South Carolina, October 8-9, 1974. 35 p, 2 fig.

Descriptors: *Oceanography, *Continental shelf, *Oceans, *Southeast U. S., Continental slope, Atlantic Ocean, Marine biology, Ocean circulation, Ocean currents, Physical properties, Tides, Estuaries, Sediment transport, Nutrients, Environmental effects, Radioactivity, Offshore platforms, Background radiation, Project planning, Project feasibility, Planning, Research priorities, *Research and development.
Identifiers: Offshore nuclear powerplants.

On October 8-9, 1974, 41 oceanographers from the southeastern United States gathered at the Savannah River Laboratory, Aiken, South Carolina, to recommend the elements of a unified research program that would contribute to a better understanding of the ocean system over the continental shelf south of Cape Hatteras. The effort was an experiment with two objectives: (1) to bring together a cross-section of oceanographers familiar with the existing and past oceanographic research on the southeastern continental shelf and to allow some interaction across the disciplines; and (2) to provide guidance to the AEC and its successor, the Energy Research and Development Administration (ERDA), on what types of oceanographic research programs could be reasonably undertaken in the southeast with constraints in funding and time. Four groups were formed: Physical Oceanography, Sediment Transport, Geochemical Transport, and Biological Oceanography. The ultimate long-term objective for ERDA is to fund research programs that would assess the impact of offshore nuclear power reactors and other energy-related activities in the environment of the southeastern continental shelf. However, the working objective of the groups in the workshop was to design a research program that would enhance our understanding of the system. This is prerequisite for separating out the abnormal working of the system caused by man-made impact from the 'normal' working of the system before energy-related activities are initiated. Each group was requested to place priorities on the scope of their research, implying recognition, a priori, that every conceivable problem could not be attacked in depth. (Sims-ISWS)
W76-00533

THE MEDITERRANEAN OUTFLOW--A SIMPLE ADVECTION-DIFFUSION MODEL,
Rhode Island Univ., Kingston. Graduate School of Oceanography.
P. L. Richardson, and K. Mooney.
Journal of Physical Oceanography, Vol 5, No 3, p 476-482, July 1975. 6 fig, 17 ref. ONR N00014-68-A-0215-0003, N00014-74-C-0262 (NR083-004).

Descriptors: *Ocean currents, *Salinity, *Advection, *Mixing, *Circulation, *Atlantic Ocean, Mathematical models, Velocity, Diffusion, Oceans, Distribution.
Identifiers: Peclet number, *Mediterranean water tongue, Salinity anomalies.

The influence of the subtropical gyre on the spread of Mediterranean water in the Atlantic was discussed in terms of a simple horizontal advection-diffusion model. The northern, southern, and western boundaries of a rectangular ocean were treated as salt sinks while the distribution of salinity on the east coast representing the highly saline Mediterranean water was represented as a sine curve. The velocity distribution for the subtropical gyre was that given by Stommel and included westward intensification. Salinity distributions were calculated for various values for the Peclet number, and for oceanographically reasonable values they indicated that the gyre passed through the high-salinity tongue and advected it toward the south and west. The model was consistent with the observed salinity distribution of the mid-layers of the North Atlantic. (Adams-ISWS)
W76-00544

FATE OF TRACE METALS IN LOS ANGELES COUNTY WASTEWATER DISCHARGE,
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering; and Massachusets Inst. of Tech., Cambridge. Ralph M. Parsons Lab. for Water Resources and Hydrodynamics.
For primary bibliographic entry see Field 5B.
W76-00545

THE THEORY OF WAVE PROPAGATION IN WATER OF GRADUALLY VARING DEPTH AND THE PREDICTION OF BREAKER TYPE AND HEIGHT,
Oregon State Univ., Corvallis. School of Oceanography.
M. K. Gaughan, and P. D. Komar.
Journal of Geophysical Research, Vol 80, No 21, p 2991-2996, July 20, 1975. 9 fig, 8 ref.

Descriptors: *Ocean waves, *Waves(Water), *Beaches, Analysis, Theoretical analysis, Coastal engineering, Hydrodynamics, Height, Depth, Wavelengths, Profiles, Coasts.
Identifiers: *Breaking waves, *Wave steepness, Breaking depth.

Biesel's theory of wave propagation in water of gradually varying depth was applied to determine the dependence of breaker type (plunging or spilling) on beach slope and on deep water wave steepness, the ratio of the wave height to the wave length. With the fluid motion at the surface represented in Lagrangian coordinates, a graph was developed for the breaker type on the basis of 21 combinations of beach slope and deep water wave steepness. Comparison with laboratory wave tank data on breaker types showed good agreement with the theoretically-based graph. The steepening of the shoaling wave profile on the shoreward wave face resulted in the occurrence of a vertical surface. The first appearance of such a vertical surface provided a natural breaking criterion compatible with experimental usage. Using this breaking criterion, the ratios of breaking wave height to deep water wave height to depth at the breaking point were theoretically evaluated. The dependence of the ratio of breaking weave height to deep water wave height on the deep water wave steepness was correctly demonstrated by the theory. (Adams-ISWS)
W76-00557

EDGE WAVES AND BEACH CUSPS,
Scripps Institution of Oceanography, La Jolla, Calif.
R. T. Guza, and D. L. Inman.
Journal of Geophysics Research, Vol 80, No 21, p 2997-3012, July 20, 1975. 10 fig, 2 tab, 54 ref. NOAA USDC 2-35208.

Descriptors: *Waves(Water), *Beach erosion, *Resonance, *Coasts, Shores, Ocean waves, Beaches, Laboratory tests, Analysis, Geomorphology, Theoretical analysis, On-site data collections.
Identifiers: *Edge waves, *Beach cusps, *Wave reflection.

The spacings of some beach cusps formed under reflective wave conditions both in the laboratory and in certain natural situations were shown to be consistent with models hypothesizing formation by: (1) subharmonic edge waves (period twice that of incident waves) of zero mode number, or (2) synchronous edge waves (period equal to that of incident waves) of low mode. Laboratory experiments showed that visible subharmonic edge wave generation occurred on nonerodable plane beaches only when incident waves were strongly reflected at the beach. Edge wave resonance theory and experiments suggested that synchronous potential edge wave generation could occur on reflective beaches and would have a higher-order, weaker resonance than the subharmonic type. In dissipative systems, modes of longshore periodic motion other than potential edge waves have been found to be important. On reflective plane laboratory beaches, initially large subharmonic edge waves rearranged sand tracers into shapes resembling natural beach cusps, but the edge wave amplitudes decreased as the cusps grew. Cusp growth was limited by negative feedback from the cusps to the edge wave excitation process. Small edge waves formed longshore periodic morphologies by providing destablizing perturbations on a berm located in the swash zone. In this case, the retreating incident wave surge was channelized into breeches in the berm caused by the edge waves, and initial feedback from the topography to the longshore periodic perturbations was positive. (Adams-ISWS)
W76-00558

SALT WATER INTRUSION INTO POROUS MEDIA,
S. V. Regional Coll. of Engineering and Technology, Surat (India).
R. N. Shelat, P. R. Mehta, and G. G. Patel.
Journal of the Institution of Engineers (India), Vol 55, Part PH 2, p 55-60, February, 1975. 8 fig, 7 ref.

Descriptors: *Model studies, *Saline water intrustion, Encroachment, *Aquifers, Interfaces, Recharge, Saline water-freshwater interfaces, Subsurface waters, Hydrology, *Porous media, Groundwater.

Experimental model studies were performed to investigate some aspects of subsurface salt water intrusion. The problem of salt water intrustion into coastal aquifers is essentially a problem of stratified fluid flow in porous strata. A boundary surface or interface is formed wherever the two fluids (freshwater and seawater) are in contact. The experimental apparatus comprised a Hele-shaw model, pumping arrangement, and controlling devices. The model consisted of two pieces of 12 mm thick plate glass spaced about 2 mm apart and connected to a reservoir consisting of 20 cm x 20 cm x 70 cm high perspex sheet at either end. A well defined interface between lighter and heavier fluids was shown and the Ghyben-Herzberg relationship was satisfied. A type of mixing distinct from diffusion occurred at the interface whenever the interface shifted. The wedge front velocity was determined to be inversely proportional to wedge length and also dependent upon the inclination of impervious beds and density of the intruding fluid. The fresh water piezometric surface must be above the mean sea level a distance equal to S minus one times the distance below sea level to the lowest pumping zone which must be protected in order to prevent sea water intrusion into coastal aquifer, where S is the specific gravity of sea water. For an aquifer of finite thickness, the maintenance of fresh water surface above sea level will result in seaward loss of fresh water. The relationship between the equilibrium wedge length and the rate of seaward flow of fresh water is independent of the distance of the aquifer below sea level. Correction in overdraft conditions by suitable recharge is a feasible method to check the intrusion. (Orr-FIRL)
W76-00614

INTERSTITIAL WATER STUDIES ON SMALL CORE SAMPLES, LEG 22,
Geological Survey, Woods Hole, Mass.
F. T. Manheim, L. S. Waterman, and F. L. Sayles.
In: Initial Reports of the Deep Sea Drilling Project, Vol 22, National Science Foundation, p 657-662, 1974: Washington, DC, U.S. Government Printing Office. 6 p, 1 fig, 2 tab, 2 ref.

Descriptors: *Connate water, *Indian Ocean, *Sediments, *Core drilling, *Water types, Sampling, Data collections, Geologic time,

Geochemistry, Chemical analysis, Subsurface waters, Geologic formations, Sedimentology, Pore water, Saline water.
Identifiers: *Intersititial water.

Interstitial waters from Leg 22 in the Indian Ocean revealed two unique results: Site 214, on the Ninetyeast Ridge, penetrated through a 30-meter sequence of fine-grained basalt and reentered hard, silty clay containing carbonate skeletal debris. Such a basalt layer may well have been impervious and extensive enough to seal off underlying (fossil) seawater of Paleocene age. However, except for a marked increase in calcium and a slight increase in chloride, no appreciable changes in pore fluid chemistry could be confirmed. Site 217, at the northernmost end of the Nintyeast Ridge, demonstrated record concentrations of interstitial calcium in clayey nanofossil oozes and a relatively small but signficant increment in chloride with depth. Presumably, these increments signal the existence of evaporitic sediments or evaporite-influenced brines at considerable greater depth than penetrated. (Woodard-USGS)
W76-00665

NUTRIENT EXCHANGE IN WATER-SEDIMENT INTERFACE AND ITS EFFECTS ON WATER QUALITY,
Rhode Island Univ., Kingston. Dept. of Civil and Environmental Engineering.
For primary bibliographic entry see Field 5C.
W76-00715

BURYING BEHAVIOR IN RELATION TO SUBSTRATE AND TEMPERATURE IN THE HERMIT CRAB, PAGURUS LONGICARPUS,
Maryland Univ., Princess Anne. Dept. of Biology.
S. Rebach.
Ecology, Vol 55, No 1, p 195-198, 1974, Illus.

Descriptors: *Migration, *Crabs, Water temperature, Animal behavior.
Identifiers: Narragansett Bay, Pagurus longicarpus.

Pagurus longicarpus migrates in autumn from a shallow estuary to deeper waters of Narragansett Bay, Rhode Island(USA), when ambient water temperatures are between 10 and 4 C. Critical thermal minimum experiments indicated that crabs ceased locomotor activity at approximately 3 C and righting response at 1.5 C. When presented with differnt substrates, crabs used their walking legs and, occasionally, their chelae to scoop a depression in the substrate. They were not able to construct a proper depression in gravel and, although they succeeded in burying themselves in both mud and sand, they remained buried only in sand. Winter dredging seaward of an estuary in which hermit crabs were found in summer showed the greatest density of crabs at 16-18 m water depth, buried in fine sand. No crabs were found several m away at 20 m on a silty mud bottom. The water temperature was less than 2 C in all areas sampled. As environmental temperatures decrease, hermit crabs probably move into deeper water and bury themselves in regions of sandy bottom. Overwintering in this manner might decrease the predation of hermit crabs by benthic organisms while the crabs are in a state of torpor.--Copyright 1974, Biological Abstracts, Inc.
W76-00829

EFFECTS OF SALMON CANNERY WASTES ON WATER QUALITY AND MARINE ORGANISMS,
Washington Univ., Seattle. Fisheries Research Inst.
For primary bibliographic entry see Field 5C.
W76-00861

SEAGRASSES OF SOUTH-WESTERN AUSTRALIA WITH SPECIAL REFERENCE TO THE ECOLOGY OF POSIDONIA AUSTRALIS HOOK F. IN A POLLUTED ENVIRONMENT,
Western Australia Univ., Nedlands. Dept. of Botany.
For primary bibliographic entry see Field 5C.
W76-00870

MERCURY IN FISH IN THE DERWENT ESTUARY, TASMANIA, AND ITS RELATION TO THE POSITION OF THE FISH IN THE FOOD CHAIN,
Commonwealth Scientific and Industrial Research Organization, Hobart Australia. Tasmanian regional.
For primary bibliographic entry see Field 5A.
W76-00871

BACTERIOLOGICAL STUDIES OF WICOMICO RIVER SOFT-SHELL CLAM (MYA ARENARIA) MORTALITIES,
Maryland Univ., College Park. Dept. of Microbiology.
For primary bibliographic entry see Field 5C.
W76-00873

CAUSES OF DECREASE AND DISAPPEARANCE OF THE SEAGRASS POSIDONIA OCEANICA ON THE FRENCH MEDITERRANEAN COAST (CAUSES DE LA RAREFACTION ET DE LA DISPARATION DES HERBIERS DE POSIDONIA OCEANICA SUR LES COTES FRANCAISES DE LA MEDITERRANEE),
Centre d'Oceanographie, Marseille (France). Station Marine d'Endoume.
For primary bibliographic entry see Field 5B.
W76-00876

TRACE METAL LEVELS IN BEACH DIPTERANS AND AMPHIPODS,
Stanford Univ., Pacific Grove, Calif. Hopkins Marine Station.
For primary bibliographic entry see Field 5A.
W76-00877

ANNUAL REPORT 1974.
New South Wales Univ., Kensington(Australia). Water Research Lab.
For primary bibliographic entry see Field 9C.
W76-00883

MAGIC ISLAND...TEN YEARS AFTER,
Belt, Collins and Associates Ltd., Honolulu, Hawaii.
For primary bibliographic entry see Field 8A.
W76-00889

VOLUMETRIC CHANGES IN BEACH PROFILES,
Glamorgan Polytechnic, Pontypridd(Wales).
A. T. Williams.
Shore and Beach, Vol. 42, No. 2, p 23-28, October 1974. 8 fig, 7 ref.

Descriptors: *Beaches, *Erosion, *Waves(Water), *Bays, *Winds, *Typhoons, Tides, Cyclones, Deposition(Sediments), Wind tides, Currents(Water), Asia.
Identifiers: *Longshore current, *Accretional changes, *Hong Kong Island, Swells.

Three beaches located on Hong Kong Island were investigated with regard to monthly changes in beach profiles. At each of the beaches two profiles were measured. The study was concerned with accretional and erosional changes that took place between successive survey periods. For one of the beaches, the maximum vertical profile changes recorded were nearly one meter. During the 1970 and 1971 surveying seasons the bulk of the tropical cyclones affecting Hong Kong generated low swells, and these rather than the influence of onshore and offshore winds during the summer appeared to be the dominant influence on beach changes. Sediment removal by large typhoonal wave attack was rapid, but in the study period little beach sediment was removed. The changes recorded confirmed impressions of seasonal reversals of beach processes. The beaches were in a state of dynamic equilibrium so that fears of permanent sediment removal were probably groundless. (Bhowmik-ISWS)
W76-00890

MODE TIDES,
California Univ., San Diego, La Jolla. Inst. of Geophysics and Planetary Physics.
B. Zetler, W. Munk, H. Mofjeld, W. Brown, and F. Dormer.
Journal of Physical Oceanography, Vol. 5, No. 3, p 430-441, July 1975. 2 fig, 4 tab, 15 ref, 1 append.
ONR N00014-69-A-0200-6008, NSF GX-29052.

Descriptors: *Tides, *Atlantic Ocean, *Ocean currents, Measurement, Analysis, Analytical techniques, Diurnal, Currents(Water), Oceanography.
Identifiers: *MODE, Bottom pressures, Deep-sea tides, Gravitational tides, Radiational tides, Tidal currents.

Bottom pressure measurements at four MODE stations constitute a unique set of deepsea tidal measurements. A response analysis relative to a Bermuda reference has been optimized with regard to the number of complex weights and the makeup of gravitational and radiational inputs. Duplicate instrumentation on EDIE capsule gave 32.067, 2.5 degrees; 32.074, 2.6 degrees for M sub 2 amplitude (cm) and Greenwich epoch, thus attesting the reality of measured small station differences (order 1 cm, 1 degree). M sub 2 tidal currents (calculated from the M sub 2 surface and bottom slopes) have u and v speeds of 0.5 and 0.8 cm/s, respectively, in rough agreement (both amplitude and phase) with preliminary estimates from current measurements. M sub 2 and K sub 1 tides are in accord with some existing cotidal and corange charts. M sub 3 tides are a fraction of equilibrium magnitude, whereas M sub 4, M sub 5, and M sub 6 (typically 0.07, 0.05, 0.03 cm) vastly esceed equilibrium values. Presumably these overtides are generated by nonlinear coupling in the world's shallow basins, from where they radiate into the global oceans to attain a level where radiative and dissipative processes are somehow balanced. (Sims - ISWS)
W76-00905

SEASONAL VARIATION IN TRANSPORT OF THE PACIFIC NORTH EQUATORIAL CURRENT RELATIVE TO THE WIND FIELD,
Hawaii Univ., Honolulu. Dept. of Oceanography.
G. Meyers.
Journal of Physical Oceanography, Vol. 5, No. 3, p 442-229, July 1975. 6 fig, 1 tab, 25 ref. ONR N00014-67-A-0387-0017.

Descriptors: *Ocean currents, *Winds, *Thermocline, *Pacific Ocean, Measurement, Surveys, Sampling, Movement, Ocean circulation, Water circulation, Oceans, Model studies, Meteorology, Oceanography.
Identifiers: *Ekman pumping, Trade winds, Volume transports.

Geostrophic transports in the upper 300 m relative to 1000 db were computed from observations along four meridional sections occupied monthly during the Trade Wind Zone Oceanography Study, February 1964 to June 1965. Transports varied from a minimum of about 11,000,000, cu m/s in February of both 1964 and 1965 to a maximum of 23,000,000 cu m/s in September 1964. The ridge in the thermocline at the southern edge of the current rose or fell simultaneously as the transport increased or decreased. Theoretical vertical dis-

placements were computed from the wind stress curl. The observed vertical displacements of the thermocline were similar to the computed displacements. Thus, the observations of the Trade Wind Zone Oceanography Study are in agreement with a simple model of variation in the strength of equatorial currents. According to the model, the divergence of Ekman transports causes variation in the meridional slope of the thermocline and in the geostrophic current speed. (Sims - ISWS)
W76-00906

MOVEMENT OF SURFACE DRIFTERS IN THE AMERICAN MEDITERRANEAN,
Connecticut Univ., Groton. Marine Sciences Inst.
D. L. Murphy, D. F. Paskausky, W. D. Nowlin, Jr., and W. J. Merrell, Jr.
Journal of Physical Oceanography, Vol. 5, No. 3, p 549-551, July 1975. 2 fig, 1 tab, 2 ref.

Descriptors: *Ocean circulation, *Drift bottles, *Gulf of Mexico, Currents(Water), Ocean currents, Movement, Water circulation, Oceans, Oceanography.
Identifiers: *Caribbean Sea, American Mediterranean.

Between October 25 and December 11, 1973, 1015 surface drifters were launched at 36 stations in the American Mediterranean. Returns from 75 drifters (7.4%) have been received from 23 (64%) of the 36 stations. No flow into the Caribbean Sea through the Mona and Windward Passages was indicated. A net westward drift in the Caribbean Sea of 0.18 m/s was indicated. Movement in the Gulf of Mexico was consistent with observations and models of the Loop Current. (Sims - ISWS)
W76-00907

(COUNCIL ON EDUCATION IN THE GEOLOGICAL SCIENCES) PROGRAMS PUBLICATIONS, NO 18, ESTUARINE OCEANOGRAPHY,
F. F. Wright.
Mc-Graw Hill, New York, NY, 1974, 76 p, Illus, Maps.

Descriptors: *Estuarine environment, Oceanography, Limnology, Education.

Techniques for studying estuarine oceanography are outlined in this publication which is designed as a laboratory supplement for undergraduate courses in oceanography or limnology. The estuarine environment is discussed, e.g., geomorphology, geology, biology and oceanography. The techniques to be employed are then described. These methods include: study-site selection; working boats; bathymetric survey; tides and tidal observations; wave determination and analysis; current measure; water sampling and analysis and tracer and diffusion studies. Mixing and flushing in estuaries is also considered. An exercise on a model estuary, Hypothetical Bay, is included with study plans. Appendices provide additional information on the use of commercial equipment for classroom studies, current drogue specifications, bathymetric survey dats sheets, current measurement sheets, drift-can data and inshore T-S 9temperature-salinity) probe survey sheets. Numerous graphs and illustrations supplement the test.--Copyright 1974, Biological Abstracts, Inc.
W76-00994

SPHAEROMA TEREBRANS: A THREAT TO THE MANGROVES OF SOUTHWESTERN FLORIDA,
University of South Florida, Tampa. Dept. of Biology.
For primary bibliographic entry see Field 5C.
W76-00998

3. WATER SUPPLY AUGMENTATION AND CONSERVATION

3A. Saline Water Conversion

EVALUATION OF NEW REVERSE OSMOSIS MEMBRANES FOR THE SEPARATION OF TOXIC COMPOUNDS FROM WASTEWATER, SECOND ANNUAL SUMMARY REPORT,
Illinois Univ. at Urbana-Champaign. Dept. of Environmental Engineering.
For primary bibliographic entry see Field 5D.
W76-00512

DESALTERS SOW SEEDS FOR SAUDI INDUSTRY.
Chemical Week, Vol 117, No 7, p 57-58, August 13, 1975.

Descriptors: *Desalination, *Treatment facilities, Design, Powerplants, Sea water, Electrical engineering, Waste water treatment, Water treatment.
Identifiers: *Saudi Arabia.

Three dual-purpose desalination and electric generating plants have been planned for Saudi Arabia. A 50 mgd, 500-mw plant in Jedda on the Red Sea is being designed by a British firm, while two plants in the Eastern province, a 30 mgd, 300-mw plant at Al-Jobail and a 5 mgd, 50-mw plant at Al-Khafji, are being designed by a United States corporation. A conventional desalination method of multistage flash evaporation will be employed. While this technique requires a large amount of steam to make fresh water, the hydrocarbons necessary for producing steam are plentiful in Saudi Arabia and the need for water is crucial. By integrating the desalting plants with the production of electrical power, the fresh water production costs will be only 12 cents per cu m. The actual engineering, designing, and construction of the three plants will cost $15 billion and contracts will be divided into packages for bidding. Among these packages are: a power plant, including the steam boiler, site preparation, intake and outfall for the plant; living quarters for workers building the plant; and outside facilities such as power transmission. Additionally, Saudi Arabia has provided $3.5 million to organize a research center to study seawater desalination and related problems such as corrosion. (Kramer-FIRL)
W76-00636

THE EFFECT OF FINITE CHANNEL WIDTH ON CONCENTRATION POLARISATION REVERSE OSMOSIS UNDER LAMINAR FLOW CONDITIONS,
Birmingham Univ. (England). Dept. of Chemical Engineering.
J. W. Carter, and G. Hoyland.
Chemical Engineering Science, Vol 30, No 9, p 1190-1191, September, 1975. 4 fig, 1 tab, 9 ref.

Descriptors: *Membrane processes, *Reverse osmosis, Laboratory tests, Mathematical models, Separation techniques, Semipermeable membranes, Laminar flow, Membranes, Liquid wastes, Desalination processes, Waste water treatment.

In previously published theoretical treatments of reverse osmosis during laminar flow in channels of rectangular cross-section, the effect of the side walls on the local velocity gradient, and therefore on local concentration polarization, has been assumed to be negligible. The fact that this assumption does not hold true for narrow channels was theoretically investigated by considering the velocity distribution in the cross-section of a channel of finite width. Experimental investigations were conducted by making a membrane impermeable adjacent to the side walls. The effect of the side walls on the velocity profile was theoretically demonstrated to be largely confined to a width adjacent to them equal to the channel height. Two sets of laminar flow reverse osmosis experiments were conducted using sodium chloride solutions. Smooth clean semi-permeable cellulose acetate membranes were used in each case. The experimental and predicted concentration polarization at the membrane surface in each of the two sample compartments was calculated. Masking is required for experimental results to conform with predictions based on an infinitely wide channel. (Orr-FIRL)
W76-00642

ENERGY QUALITY INTERACTIONS OF SUNLIGHT, WATER, FOSSIL FUEL, AND LAND,
Florida Univ., Gainesville, Dept. of Environmental Engineering Sciences.
For primary bibliographic entry see Field 3E.
W76-00754

ADVANCED PROCESSES: WATER DESALTING AND REUSE,
Arizona Univ., Tucson. Dept. of Civil Engineering and Engineering Mechanics.
For primary bibliographic entry see Field 5D.
W76-00756

ION EXCHANGE WATER TREATMENT,
For primary bibliographic entry see Field 5F.
W76-00850

3B. Water Yield Improvement

A GEOPHYSICAL METHOD FOR DETERMINATION OF AQUIFER PARAMETERS OF HARD ROCKS,
Central Water and Power Research Station, Poona (India).
For primary bibliographic entry see Field 2F.
W76-00529

POTENTIAL OF MADISON GROUP AND ASSOCIATED ROCKS TO SUPPLY INDUSTRIAL WATER NEEDS, POWDER RIVER BASIN, WYOMING AND MONTANA,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 4B.
W76-00666

EVAPOTRANSPIRATION BY PHREATOPHYTES IN THE NORTH PLATTE BASIN OF WYOMING,
Wyoming Univ., Laramie. Water Resources Research Inst.
For primary bibliographic entry see Field 2D.
W76-00673

DEMONSTRATED TECHNOLOGY AND RESEARCH NEEDS FOR REUSE OF MUNICIPAL WASTEWATER,
SCS Engineers, Long Beach, Calif.
For primary bibliographic entry see Field 5D.
W76-00692

SOIL WETTABILITY AND FIRE IN ARIZONA CHAPARRAL,
Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.
For primary bibliographic entry see Field 2G.
W76-00698

ARIZONA STATE WATER PLAN, PHASE I: INVENTORY OF RESOURCE AND USES,
Arizona Water Commission, Phoenix.
For primary bibliographic entry see Field 6B.
W76-00700

3C. Use Of Water Of Impaired Quality

SALINITY POLICY FOR COLORADO RIVER BASIN,
Colorado State Univ., Fort Collins. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 5G.
W76-00553

EFFECTS OF FREQUENCY OF SPRINKLING WITH SALINE WATERS COMPARED WITH DAILY DRIP IRRIGATION,
Agricultural Research Service, Riverside Calif. Salinity Lab.
L. Bernstein, and L. E. Francois.
Agronomy Journal, Vol 67, No 2, p 185-190, March-April, 1975. 2 fig, 6 tab, 13 ref.

Descriptors: *Sprinkler irrigation, *Crop production, *Plant physiology, *Irrigation water, Sprinkling, Saline water, Salts, Sodium chloride, Calcium chloride, Salt torerance, Foliar, Leaves, Irrigation effects, Plant growth, Crop production, Application methods.
Identifiers: *Drip irrigation, Plant injury, Foliar, Salt absorption, *Bell peppers.

Bell peppers (Capsicum frutescens) were sprinkled every 2.3, 3.5, and 4.75 days with low salt (450 mg/liters) and medium and high salt waters (1,000 and 2,000 mg/liter of added NaC1 + CaC12). Additional plots were drip irrigated with the same waters. Sprinkling with the low- salt water and drip irrigation with all 3 waters caused no leaf damage. Plants sprinkled every 2.3 days with the 2 high salt waters suffered more leaf burn and produced lower yields than plants sprinkled less often. Sprinkling with the high-salt water reduced yields more than 50% at all sprinkling frequencies. Injury and yield loss appear to be related primarily to foliar salt absorption. (Robinett-Arizona)
W76-00708

RESPONSE TO THREE SEMIDWARF MEXICAN WHEATS TO DIFFERENT AERATION CONDITIONS IN THE ROOTING MEDIUM AT A CONSTANT SALINITY LEVEL,
Escuela Nacional de Agricultura Chapingo (Mexico).
Aceves, N. Everardo, L. H. Stolzy, and G. R. Mehuys.
Soil Science Society of America Proceedings, Vol 39, No 3, p 515-518, May-June 1975, 2 fig, 2 tab, 13 ref.

Descriptors: *Soil gasses, *Aeration, *Oxygen requirements, *Root zone, *Plant growth, *Wheat, Agriculture, Soil environment, Environmental control, Soil physical properties, Soil properties, Soil chemistry, *Soil-water-plant relationships, Soil physics, Dissolved oxygen, Oxygenation, Zone of aeration, Plant growth, Crop response, Plant physiology, Salinity, Root development, Mexico, Transpiration.
Identifiers: *Mexican wheat, Nuri 70, Inia 66, Siete Cerros 66.

The response of 3 newly developed Mexican wheat (Triticum aestivum L.) varieties, Nuri 70, Inia 66, and Siete Cerros 66, to low oxygen at constant salinity of -4 bars in the rooting medium was tested in a water culture experiment under growth chamber conditions. Oxygen concentrations in solution were maintained at 1.5, 5.2, and 7.6 ppm. All varieties were affected by low oxygen at high salinity but Inia 66 had the greatest adaptability. Oxygen concentrations of 1.5 ppm decreased plant dry-matter production by 50% and reduced transpiration by 54-65%. Root porosities increased with each decrease in oxygen content, with Inia 66 showing the largest increase. A 5.2 ppm oxygen concentration in solution was found to be optimum for grain yield, water use, and leaf and root dry matter production if Inia wheat was grown without salinity stress in the root zone. (Robinett-Arizona)
W76-00710

WATER REPELLENT SOIL MULCH FOR REDUCING FERTILIZER NUTRIENT LEACHING: II. VARIABLES GOVERNING THE EFFECTIVENESS OF A SILICONATE SPRAY,
Agricultural Research and Education Center, Belle Glade, Fla.
G. H. Snyder, H. Y. Ozaki, and N. C. Hayslip.
Soil Science Society of America Proceedings, Vol 38, No 4, p 678-681, July-August, 1974. 4 tab, 7 ref.

Descriptors: *Mulching, *Nitrogen, *Potassium, *Leaching, *Nutrients, *Sweet corn, Crop production, Crop response.

Nitrogen and potassium leaching from a fertilizer band in sand soils was reduced by creating a mulch of water repellent soil over the band using a siliconate spray. Best results were obtained using a 1% siliconate spray in quantities sufficient to penetrate about 3 cm over a region 20 cm wide, on the flat surface of raised vegetable beds. Mulches created on peaked beds were ineffective in reducing leaching, probably due to erosion of the mulch. Sweet corn yields are comparable to those obtained by protecting N and K with plastic mulch or by applying N and K in split applications. (Skogerboe-Colorado State)
W76-00719

DIFFERING SENSITIVITY OF CORN AND SOYBEAN PHOTOSYNTHESIS AND TRANSPIRATION TO LEAD CONTAMINATION,
Illinois Univ., at Urbana-Champaign.
For primary bibliographic entry see Field 5B.
W76-00720

NITROGEN-15 VARIATIONS IN FERTILIZER NITROGEN,
Kernforschungsanlage, Juelich (West Germany). Institut fuer Physikalische Chemie.
For primary bibliographic entry see Field 5A.
W76-00722

THE CONTROL OF NITRATE ACCUMULATION IN SOILS BY INDUCED DENITRIFICATION,
Technion-Israel Inst. of Tech., Haifa.
For primary bibliographic entry see Field 5B.
W76-00732

EFFECT OF SALTS AND SALTS PLUS NITROGEN-15-LABELED AMMONIUM CHLORIDE ON MINERALIZATION OF SOIL NITROGEN, NITRIFICATION, AND IMMOBILIZATION,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
R. L. Westerman, and T. C. Tucker.
Soil Science Society of America Proceedings, Vol 38, No 4, p 602-605, July-August, 1974. 1 fig, 5 tab, 11 ref.

Descriptors: *Nitrogen, *Nitrification, Salinity, *Salts, *Ammonium compound, Water pollution sources.
Identifiers: *Mineralization, Immobilization.

The effects of 0.0, 0.01, 0.1 and 1.0M concentrations of sodium, copper and calcium chloride salts added to Pima clay loam with and without (15) NH4C1 on mineralization of soil nitrogen, nitrification, and immobilization were measured over a 49-day period. Dilute concentrations of salt, (15) NH4C1, and dilute salts plus (15) NH4C1 stimulated mineralization of soil N. The 'priming effect' was shown to be real and not just a simple exchange. Nitrification of native ammonium nitrogen and (15) N-labeled ammonium decreased with increasing concentrations of salt. High concentrations of copper and calcium chloride salts inhibited nitrification of (15) N-labeled ammonium more than sodium salts. Immobilization of (15) NH4 (+) -N was decreased significantly by high concentrations of salt. Gaseous loss processes were decreased with increased salts. (Skogerboe-Colorado State)
W76-00735

INTERACTIVE EFFECTS OF SALINITY AND FERTILITY ON YIELDS OF GRAINS AND VEGETABLES,
Agricultural Research Service, Riverside, Calif. Salinity Lab.
L. Bernstein, L. E. Francois, and R. A. Clark.
Agronomy Journal, Vol 66, No 3, p 412-421, May-June, 1974.

Descriptors: *Salt tolerance, Salinity, *Crop response, *Fertilization, Saline soils, Corn(Field), Wheat, Barley, Vegetable crops, Phosphates, Crop production.

The salt tolerance of crops has usually been studied under optimal fertility conditions. The objectives of the present studies were to compare crop response to salinity when nutrients were limiting, adequate, or in excess to guide proper fertilization of saline soils and to determine whether additional fertilizer could restore yield losses caused by salinity. Corn, wheat, barley, and six vegetable crops were grown to maturity in large, outdoor sand cultures to study the interactive effects of salinity and nutrition. Increasing levels of phosphate (0.1 to 2.0 mM) aggravated salt injury in corn and decreased salt tolerance. Decreasing solution K from 2 to 0.4 meq/liter did not affect leaf K or yield of corn. Deficient levels of P or N did not consistently decrease salt tolerance of any of the crops studied, although the wheat and barley varieties showed erratic decreases in salt tolerance when N or P were deficient. When N or P was severely growth-limiting, salinity affected growth of some crops. Conversely, when salinity severely limited growth, nutritional responses of some crops decreased. (Skogerboe-Colorado State)
W76-00741

POTENTIAL FOR AGRICULTURE UTILIZING WASTE HEAT FROM POWER PLANTS,
Arizona Univ., Tucson. Environmental Research Lab.
N. G. Hicks.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 231-240.

Descriptors: *Water requirements, *Water utilization, *Thermal pollution, *Environmental engineering, *Greenhouses, Arizona, Water supply, Economics, Water resources, Arid lands, Water conservation, *Energy, Heat, Temperature, Plant growth, Heated water, Heating, Power plants, Horticulture, Soil temperature, Agriculture, Profit, Nutrients, Industrial plants.
Identifiers: Soil warming.

The quality of heat (temperature level) is more appropriate to the biological processes of plant and animal grwoth than it is to almost any kind of industrial or process application. Research effort has been centered on soil warming, mariculture or aquaculture, and greenhouse vegetation production. Open field agriculture crops consume from 1.5 to 6 acre feet per year of water, and yield from 100 to, at most, 400 dollars per acre in gross revenue. Controlled-environment agriculture consumes about 7 acre feet of irrigation and cooling water per year, with a gross revenue of from 60,000 to 180,000 dollars per year, and with a 95% recovery of applied nutrients by the plants. The amount of heat rejected from a southern Arizona copper smelter is more than adequate to handle the types of greenhouse facilities being conceived today, and the energy level of the heat from these

smelters has a thermodynamic availability such that conventional heating methods can be employed within the greenhouse. (See also W76-00745) (Robinett-Arizona)
W76-00757

CITY WASTE WATER REUSE FOR NUCLEAR POWER PLANT COOLING,
Arizona Public Service Corp., Phoenix.
For primary bibliographic entry see Field 5D.
W76-00760

ACCRETION AND DILUTION OF NUTRIENTS IN YOUNG CORN, AS AFFECTED BY YIELD RESPONSE TO NITROGEN, PHOSPHORUS, AND POTASSIUM,
National Fertilizer Development Center, Muscle, Ala.
G. L. Terman, and S. E. Allen.
Soil Science Society of America Proceedings, Vol 38, No 3, p 455-460, May-June 1974. 5 fig, 1 tab, 13 ref.

Descriptors: Fertilizers, Nutrient removal, Nutrients, *Nitrogen, *Phosphorus, *Potassium, *Corn(Field), *Crop response.

Hybrid corn was grown in infertile soil fertilized with none and three nonzero rates of N, P, or K in separate treatment series; other nutrients were applied in each series at uniform levels. Near-linear increases in uptake of N, P, or K with amount applied occurred during 25, 41, and 53 days' growth. Concentrations of N, P, or K increased with amount applied and decreased with continued growth in each series; uniformly applied P and K, N and K, or N and P were diluted with increase in dry matter resulting from continued growth and yield response to increasing amounts of the third nutrient. Yield-concentration relationships in the N response series were similar for N, Ca, Mg, Mn, and Zn. Response to P or K resulted in dilution of all other nutrients. Concentrations of total cations increased with concentrations of N in each response series; the reverse was true with P and K. Thus, the results suggest that a positive relationship between dry matter yields and total cations (C), total inorganic anions (A), and C-A depends on whether yield reponse is due to N or to other growth-limiting factors. (Skogerboe-Colorado State)
W76-00823

SOIL PHOSPHORUS AVAILABILITY AS MEASURED BY DISPLACED SOIL SOLUTIONS, CALCIUM-CHLORIDE EXTRACTS, DILUTE-ACID EXTRACTS, AND LABILE PHOSPHORUS,
Colorado State Univ., Fort Collins. Dept. of Agronomy; and Colorado State Univ., Fort Collins. Dept. of Soil Sciences.
P. N. Soltanpour, F. Adams, and A. C. Bennett.
Soil Science Society of America Proceedings, Vol 38, No 2, p 225-228, March-April, 1974. 4 fig, 17 ref.

Descriptors: *Fertilizers, Fertility, *Soil tests, Sorghum, Crop response, *Phosphorus, Water quality, Water pollution sources, Measurement.

Five rates of Ca(OH)2 and four rates of Ca(H2PO4)2-H2O were added in all combinations to samples of a P-deficient, low pH, sandy loam soil. The treated soil was subjected to several wetting-drying-pulverizing cycles to facilitate equilibration. Soil solutions were subsequently displaced from sub-samples and analyzed; other subsamples were extracted for P and CaCl2 and dilute acid; 'labile P' was determined on subsamples from each treatment; a sorghum-sudangrass hybrid was grown in the greenhouse to measure P availability. Maximum yield of test plants was obtained at about 22 micro-m of P in the displaced soil solution, 12 micro-m of P in the CaCl2 extract, 80 ppm P on soil-weight basis in dilute-acid extract, and 50 ppm of 'labile P' on soil-weight basis. The P uptake was highly correlated with the logarithm of P concentration in soil solution and CaCl2 extract, logarithm of 'labile P' and concentration of P in dilute acid extract. All indexes were nearly equal as indicators of P availability. (Skogerboe-Colorado State)
W76-00825

A TWO-PHASE MODEL FOR THE MISCIBLE DISPLACEMENT OF REACTIVE SOLUTES IN SOILS,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
J. Skopp, and A. W. Warrick.
Soil Science Society of America Proceedings, Vol 38, No 4, p 545-550, July-August, 1974. 5 fig, 1 tab, 32 ref. EPA Contract 68-03-0208.

Descriptors: *Model studies, Solutes, Adsorption, Diffusion, Connection, Soils, Calcium, Magnesium, Water quality.
Identifiers: *Miscible displacement, Solute transfer, Picloram.

Miscible displacement is studied by considering the flow regime to be composed of separate mobile and stationary phases. Solute transfer through the mobile phase occurs only by convection, whereas adsorption or reaction by the soil matrix is diffusion limited and occurs normal to the mobile-stationary interface. The model is unique in that a specific rate law is not assumed, but the solution is exact. Results are presented graphically as a function of two parameters which are compared with experimental results of other workers. The displacement of calcium by magnesium was more closely in agreement with theoretical predictions than was absorption of picloram. (Skogerboe-Colorado State)
W76-00826

EFFECT OF TRANSPIRATION RATE ON SALT ACCUMULATION AROUND CORN ROOTS IN A SALINE SOIL,
Punjab Agricultural Univ., Ludhiana, India. Coll. of Agricultural Engineering.
B. K. Sinha, and N. T. Singh.
Agronomy Journal, Vol 66, No 4, p 557-560, July-August, 1974. 1 fig, 3 tab, 11 ref.

Descriptors: *Saline soils, Salinity, Ions, *Transpiration, Salts, *Corn(Field), *Root zone.
Identifiers: Ion accumulation, Closely adhering soil, Loosely adhering soil.

Laboratory studies were conducted to determine the extent of ion accumulation around corn roots of plants exposed to different transpiration conditions. Ion accumulation in the apparent free space of roots, the soil adhering to the roots, and the bulk soil was studied using a soil mixed with sodium chloride so that the electrical conductivity of saturation extract was 3.96 mmho/cm. Maximum ion accumulation occurred in the apparent free space of the roots, followed by the closely adhering soil. Under high transpiration, sodium concentration increased from 37.6 mg/100 g in the bulk soil to 90.3 mg/100 g in the soil close to the roots. After the same treatment, a threefold increase in the chloride content of the closely adhering soil was observed. A significant correlation existed between the rate of water loss per unit root length and the Na and Cl concentration of the closely adhering soil. Results indicate that under high transpiration, the salt concentration close to the roots may be much higher than that obtained from an analysis of the bulk soil. (Skogerboe-Colorado State)
W76-00827

MINIMIZING THE SALT BURDENS OF IRRIGATION DRAINAGE WATERS,
Agricultural Research Service, Riverside, Calif. Salinity Lab.
J. D. Rhoades, J. D. Oster, R. D. Ingvalson, J. M. Tucker, and M. Clark.
Journal of Environmental Quality, Vol 3, No 4, p 311-316, October-December, 1974. 7 tab, 7 ref.

Descriptors: *Salinity, *Saline water, *Drainage, *Drainage water, Lysimeter, Return flow, Water quality, Water pollution, Alfalfa, *Saline soils, Irrigation, Irrigation practices.

The salt burdens of percolated drainage waters resulting from the use of water, synthesized to represent eight important river waters of the western USA, for irrigation of alfalfa in a controlled lysimeter experiment, are presented. These data show that minimizing the quantity of drainage water resulted in the smallest possible return of applied salts in the return flow because: (1) it maximizes the precipitation of carbonate minerals and gypsum in the soil, (2) it minimizes soil mineral weathering and the dissolution of salts previously deposited in the soil, and (3) it maximizes the amount of soluble salt diverted in the water that is retained in storage in the soil profile and not returned in the drainage water. (Skogerboe-Colorado State)
W76-00828

ASSESSING SOIL SALINITY AND IDENTIFYING POTENTIAL SALINE-SEEP AREAS WITH FIELD SOIL RESISTANCE MEASUREMENTS,
Agricultural Research Service, Sidney, Mont.
A. D. Halvorson, and J. D. Rhoades.
Soil Science Society of America Proceedings, Vol 38, No 4, p 576-581, July-August 1974. 7 fig, 4 tab, 12 ref.

Descriptors: *Salinity, *Soil tests, Soil properties, Electrical conductance, Measurement, Instrumentation, Great Plains, *Saline soils.
Identifiers: Soil conductivity.

The recent widespread increase in the occurrence of seep areas high in salinity in the northern Great Plains has increased the need for soil salinity research. The objective of the study was to examine the use of soil conductivity values calculated from resistance measurements obtained with the four-probe-Wenner electrode configuration to identify potential saline-seep areas and estimate soil salinity in the field. Plots of apparent soil conductivity (EC) vs inner-electrode spacing (a) yielded different types of curves for saline-seep areas, recharge areas, and intermediate areas. Plots of EC vs a or EC values alone can be used to identify potential saline-seep areas. Significant correlations were obtained in May (r=0.98) and August (r=0.96) between apparent soil conductivity and electrical conductivity of saturation extracts showing that four-probe soil resistance measurements can also be used to estimate soil salinity in the field. (Skogerboe-Colorado State)
W76-00835

ASSESSING A MARSH ENVIRONMENT FOR WASTEWATER RENOVATION,
Agricultural Research Center, Fort Lauderdale, Fla.
For primary bibliographic entry see Field 5D.
W76-00892

3D. Conservation In Domestic and Municipal Use

CLIMATE OF MINNESOTA, PART VIII--PRECIPITATION PATTERNS IN THE MINNEAPOLIS-ST. PAUL METROPOLITAN AREA AND SURROUNDING COUNTIES,
Minnesota Dept. of Natural Resources, St. Paul. Div. of Water, Soils and Minerals.
For primary bibliographic entry see Field 2B.
W76-00504

AN EVALUATION OF WATER REUSE FOR MUNICIPAL SUPPLY,
Southern Illinois Univ., Carbondale.
For primary bibliographic entry see Field 5D.
W76-00514

INTERCEPTOR SEWERS AND SUBURBAN SPRAWL: THE IMPACT OF CONSTRUCTION GRANTS ON RESIDENTIAL LAND USE. VOLUME I, ANALYSIS.
Urban Systems Research and Engineering, Inc., Cambridge, Mass.
For primary bibliographic entry see Field 5D.
W76-00515

OPTIMAL SIZING OF URBAN FLOOD-CONTROL SYSTEMS,
Hydrologic Engineering Center, Davis, Calif. Planning Analysis Branch.
For primary bibliographic entry see Field 4A.
W76-00554

ESTIMATING INDIRECT COST OF URBAN WATER USE,
Koebig and Koebig, Inc., Los Angeles, Calif.
C. H. Lawrence.
Journal of the Environmental Engineering Division, Proceedings of ASCE, Vol 101, No EE4, p 517-553, August, 1975. 3 fig, 4 tab, 21 ref, append.

Descriptors: *Water utilization, *Water demand, *Water costs, *Indirect costs, Water supply, Cities, Graphical methods, Dissolved solids, Hardness(Water), *Municipal water, Estimating, Water quality, Dissolved solids, Californai.
Identifiers: Total dissolved solids, Total hardness, California Water Quality Control Plan, Los Angeles(Calif).

A simplified composite graphical representation for the estimation of indirect costs of urban water use is presented. The graphs were developed from a literature search of past investigations of quality-related cost effects. The estimation technique was used during the preparation of the California Water Quality Control Plan for the Los Angeles River Planning Area Basin 4B, a large urban area with multiple sources of local and imported water supply. Estimating curves are presented to assist in the determination of the economic impact upon water consumers of mineral quality of water as shown by the parameter total dissolved solids (TDS). A total impact cost curve for urban consumers, both industrial and nonindustrial, was developed for a range of TDS between 200 mg/liter and 800 mg/liter and a range of total hardness (TH) between 100 mg/liter and 40 mg/liter assumed to be uniformly one-half of the value of TDS. The slope of the total impact cost curve is the penalty cost, and is expressed in dollars/acre-foot per 100 mg/liter TDS. The major components of the total impact cost curve are domestic plumbing, domestic water heaters, municipal waterworks equipment, industrial water treatment, and all domestic and commercial measures performed to alleviate TH. Ways are presented to modify the total impact cost curve to reflect local conditions where they may be significantly different from those assumed for the curves presented. The curves must be considered as guides, not as absolute values, and should be used in relation to the local conditions. (Orr-FIRL)
W76-00630

A TOWNSHIP'S NEED OF FILTERED WATER,
Tata Iron and Steel Co., Ltd, Jamshedpur (India). Town Engineering Dept.
B. N. Ghosh.
Journal of the Institution of Engineers (India), Vol 55, Part PH 2, p 40-42, February, 1975. 5 tab, 3 ref.

Descriptors: *Water demand, *Water supply, *Water utilization, Water users, Water requirements, Domestic water, Industrial water.

In order to determine the future water requirements of the twonship of Jamshedpur, India, the consumption of water was divided into different consuming divisions: domestic; public and municipal; commercial; industrial; and, miscellaneous and wastage. Tables are presented which illustrate the total daily consumption, both past and present, for each of these categories. The figures have been used to project future consumption figures, on the basis of expected development of each of these five categories. The township may require an average supply of 138 million liters/day of filtered water in 1986, with an expected increase over the following ten years to 157 million liters/day. The consumption rate for the population may reach 452 lped by 1986, and 476 by about 1996. Domestic consumption equalled about 75% of the total consumption in 1951, 60% of the total in 1971, and will most likely equal 53% of the total in 1996. In the future more filtered water will be used for industrial, commercial, public and municipal activities and less will be used for domestic purposes. The present growth rate of the curve for miscellaneous use and wastage must be restricted to limit the potential wastage of filtered water. (Orr-FIRL)
W76-00641

PILOT PLANT OPTIMIZATION OF PHOSPHORIC ACID RECOVERY PROCESS,
Lancy Labs., Inc., Zelienople, Pa.
For primary bibliographic entry see Field 5D.
W76-00676

SPECIFICATIONS FOR MATERIALS RECOVERED FROM MUNICIPAL REFUSE,
National Center for Resource Recovery, Inc., Washington, D. C.
For primary bibliographic entry see Field 5D.
W76-00684

RAINFALL-RUNOFF RELATIONS ON URBAN AND RURAL AREAS,
Michigan Univ., Ann Arbor. Dept. of Civil Engineering.
For primary bibliographic entry see Field 2A.
W76-00685

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES. VOLUME II - MUNICIPAL SLUDGES,
Dayton Univ. Ohio. Research Inst.
For primary bibliographic entry see Field 5E.
W76-00688

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES. VOLUME IV - MUNICIPAL INCINERATOR RESIDUES,
Dayton Univ. Ohio. Research Inst.
For primary bibliographic entry see Field 5E.
W76-00690

CHOICE BETWEEN SURFACE AND GROUNDWATER FOR WATER SUPPLIES TO URBAN CENTRES,
Societe d'Etudes pour le Traitement et Utilisation des Eaux, Paris (France).
For primary bibliographic entry see Field 4B.
W76-00814

3E. Conservation In Industry

A TOWNSHIP'S NEED OF FILTERED WATER,
Tata Iron and Steel Co., Ltd, Jamshedpur (India). Town Engineering Dept.
For primary bibliographic entry see Field 3D.
W76-00641

THE REVOLUTION IN WATER MANAGEMENT,
For primary bibliographic entry see Field 5G.
W76-00648

POTENTIAL OF MADISON GROUP AND ASSOCIATED ROCKS TO SUPPLY INDUSTRIAL WATER NEEDS, POWDER RIVER BASIN, WYOMING AND MONTANA,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 4B.
W76-00666

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES, VOLUME III - UTILITY COAL ASH,
Dayton Univ. Ohio. Research Inst.
For primary bibliographic entry see Field 5E.
W76-00689

AN INTEGRATED POWER PROCESS MODEL OF WATER USE AND WASTE WATER TREATMENT IN CHLOR-ALKALI PRODUCTION,
Houston Univ., Tex. Dept. of Quantitative Management Science.
For primary bibliographic entry see Field 5D.
W76-00707

PROCEEDINGS, CONFERENCE ON WATER REQUIREMENTS FOR LOWER COLORADO RIVER BASIN ENERGY NEEDS.
Arizona State Fuel and Energy Office (Phoenix).
For primary bibliographic entry see Field 6D.
W76-00745

OVERVIEW OF WATER REQUIREMENTS FOR ELECTRIC POWER GENERATION, (FOR THE LOWER COLORADO RIVER BASIN),
California Univ., Los Angeles. Inst. of Geophysics and Planetary Physics.
For primary bibliographic entry see Field 6D.
W76-00746

WATER USE AS A FACTOR IN MEETING ELECTRIC POWER NEEDS,
Salt River Project, Phoenix, Ariz.
For primary bibliographic entry see Field 6D.
W76-00747

WATER AND ENERGY REQUIREMENTS FOR AN OIL SHALE INDUSTRY,
Atlantic Richfield Corp., Los Angeles, Calif.
For primary bibliographic entry see Field 6D.
W76-00749

A PRELIMINARY ANALYSIS OF THE ENERGY AND WATER REQUIREMENTS FOR DEVELOPING GEOTHERMAL ENERGY IN ARIZONA,
Arizona Univ., Tucson. Dept. of Geosciences.
For primary bibliographic entry see Field 6D.
W76-00750

WATER AND ENERGY REQUIRED TO OPERATE COAL GASIFICATION FACILITIES AND WASTE WATER TREATMENT REQUIREMENTS,
El Paso Natural Gas Co., Tex.
For primary bibliographic entry see Field 6D.
W76-00751

WATER AND ENERGY REQUIREMENTS TO MINE, PROCESS, AND REPROCESS NUCLEAR FUELS,
Arizona Univ., Tucson. Dept. of Nuclear Engineering.
For primary bibliographic entry see Field 6D.
W76-00752

WATER AND ENERGY REQUIREMENTS IN THE MINING AND PROCESSING OF COAL, INCLUDING LAND RECLAMATION,
Peabody Coal Co., St. Louis, Mo.
For primary bibliographic entry see Field 6D.
W76-00753

ENERGY QUALITY INTERACTIONS OF SUNLIGHT, WATER, FOSSIL FUEL, AND LAND,
Florida Univ., Gainesville, Dept. of Environmental Engineering Sciences.
H. T. Odum.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 165-194. 16 fig, 1 tab, 4 ref.

Descriptors: *Energy, *Energy conversion, *Solar radiation, *Water utilization, Energy transfer, Energy loss, Energy dissipation, Fossil fuels, Water properties, Economics, Efficiencies, Water resources, Arid lands, Arizona, Water shortage, *Desalination, Heated water, Vegetation effects, Electric power production.
Identifiers: Energy flows, Amplifier actions, *Solar energy.

To maximize power, energy flows generate energy of higher quality and a chain of energy quality transformations develops with total calories of energy decreasing at each step but with increasing quality and concentration of that transformed. High quality energy, such as fossil fuel, realizes its value only when it is used to amplify another energy flow of lower quality with as much stimulation of new energy flow as was used in its formation. The energy qualities of a Calorie of sunlight, fossil fuel, and water estimated from the energy used in transformations are summarized. Energy relationships of desalination, solar energy conversion to electricity, solar energy use by productivity compared with solar technology, solar water heaters, and dispersed solar heat are discussed along with choices in use of energy and water in arid regions. (See also W76-00745) (Robinett-Arizona)
W76-00754

ENVIRONMENTAL ASPECTS OF SOLAR ENERGY APPLICATIONS,
Arizona Univ., Tucson. Optical Sciences Center.
A. B. Meinel, and M. P. Meinel.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 196-205.

Descriptors: *Energy, *Energy conversion, *Solar radiation, *Water utilization, *Powerplants, Efficiencies, Arizona, Water resources, Arid lands, Heated water, Electric power production, Heat transfer, Agriculture, Planning, Water conservation, Heating, Cooling.
Identifiers: *Solar energy, Solar power farms, Solar energy conversion.

The future of solar energy is described. Arizona could grow enough alfalfa to operate its power plants at a reasonable cost, but it would take most of the total flow of the Colorado River to support the irrigation load. Conversion of solar energy into heat and then using this heat for constructive purposes such as heating water for domestic and commercial applications appears to be a possible option. House heating and cooling is technologically a simple task in comparison with generating electrical power. The subject of large solar farms which would collect energy for whole communities is discussed along with the possibility of an extensive farm of solar collectors as the heat rejection system of conventional power plants. Assuming a conversion efficiency of 25%, it would require 10,000 square miles of solar farms to generate enough energy to meet the current national need. (See also W76-00745) (Robinett-Arizona)
W76-00755

WATER CONSUMPTION AND POWER PLANT HEAT REJECTION,
Arizona Univ., Tucson. Dept. of Nuclear Engineering.
R. Fazzolare.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 241-257. 6 fig, 2 tab, 3 ref.

Descriptors: *Water requirements, *Water supply, *Water demand, *Electric power industry, *Water conservation, *Nuclear power plants, Water management(Applied), Economics, Water utilization, Water resources, Arid lands, Water sources, *Arizona, Electric power production, Planning, Energy, Cooling water, Recirculated water, Heat transfer, Ventilation, Costs, Efficiencies, Water cooling, Nuclear reactors, Cooling towers, Heated water, Fossil fuels.

Water requirements and consumption in thermal electric power plants in which fossil fuels and uranium are used as the primary energy source are discussed. 50% of the heat rejection from power plants in the U.S. is of the once-through type and the other 50% is accomplished by means of cooling towers in which air passes over sprayed water and induces the evaporative cooling. For a large community, it is estimated that the waste waters produced are about 4 times the cooling requirement of a nuclear power plant that could generate the electrical needs of the community. Average cooling water evaporation for fossil fuel power generation in Arizona of a 1000 megawatt plant was 11,700 acre-feet per year and for nuclear plants from 15,000 to 19,000 acre-feet per year. Comparisons of dry and wet cooling schemes show capital costs of dry cooling systems to be 4 times that of wet towers. (See also W76-00745) (Robinett-Arizona)
W76-00758

THERMAL POWER PLANT SITING IN AN ARID REGION-ENVIRONMENTAL CONSTRAINTS,
Bechtal Power Corp., Los Angeles, Calif.
H. Ponrehn.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 258-303. 3 fig, 3 ref.

Descriptors: *Water conservation, *Water requirements, *Water supply, *Thermal powerplants, *Arid lands, *Environmental effects, Electric power industry, Economics, Water utilization, Water resources, Electric power production, Sites, Planning, Energy, Water consumption(Except Consumptive use), Locating, Ecology, Environmental engineering, Air pollution, Public health, Safety, Design criteria, Evaluation, Geology, Topography, Meteorological data, Esthetics.
Identifiers: Environmental constraints, Powerplant site selection.

There are a number of concerns in the arid region siting of thermal power plants; primary concern is the consumption of water. Additional concerns are esthetics and environmental constraints imposed on the site selection by public pressures, from regulatory agencies at all levels of government, from the engineering features of the project, and from economic pressures and scheduling constraints. Careful consideration of plant, transmission line, and access route layout and design can minimize impacts on highly sensitive and slowly recovering ecosystems which characterize arid regions. The geological and seismological characteristics of a region are of highest priority in assessing its acceptability for siting a nuclear plant, whereas fossil plant site selection, due to the concern for air quality impacts, is influenced strongly by the meteorological and topographic features of an area. Coal fired power plant site selection is severely constrained by the location of the fuel source and the economics of fuel transportation. (See also W76-00745) (Robinett-Arizona)
W76-00759

ENVIRONMENTAL COSTS FOR THE NAVAJO GENERATING STATION,
Salt River Project, Phoenix, Ariz.
For primary bibliographic entry see Field 5D.
W76-00761

3F. Conservation In Agriculture

SOIL CRUSTS.
Arizona Agricultural Experiment Station, Tucson.
For primary bibliographic entry see Field 2G.
W76-00517

THE EFFECT OF SOIL CRUSTS ON INFILTRATION: THE EFFECT OF AGGREGATE SIZE AND DEPTH OF TILLAGE ON STEADY INFILTRATION THROUGH CRUST-TOPPED TILLED SOILS,
Minnesota Univ. St. Paul.
For primary bibliographic entry see Field 2G.
W76-00539

EFFECT OF DAILY IRRIGATION ON WATER CONTENT AND SUCTION PROFILES IN SOILS OF THREE TEXTURES,
Agricultural Research Service, Prosser, Wash. Western Region.
For primary bibliographic entry see Field 2G.
W76-00697

IRRIGATION METHOD AS A DETERMINANT OF LARGE PORE PERSISTENCE AND CRUST STRENGTH OF CULTIVATED SOILS,
Colorado State Univ., Fort Collins. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 2G.
W76-00699

THE INFLUENCE OF LOCAL ADVECTION ON EVAPO-TRANSPIRATION FROM IRRIGATED RICE IN A SEMI-ARID REGION,
Commonwealth Scientific and Industrial Research Organization, Griffith (Australia). Div. of Irrigation Research.
For primary bibliographic entry see Field 2D.
W76-00713

EFFECTS OF TIME TAKEN TO APPLY AN IRRIGATION ON SEASONAL IRRIGATION REQUIREMENTS,
Department of Agriculture, Ottawa (Ontario). Chemistry and Biology Research Inst.
W. K. Sly, and J. C. Wilcox.
Canadian Agricultural Engineering, Vol 16, No 2, p 82-85, December 1974. 3 tab, 11 ref.

Descriptors: *Scheduling, *Irrigation practices, Consumptive use, *Irrigation systems, Timing, *Canada, Soil water, Water consumption.

Daily climatic data for the 30 year period 1931-60 were used in two routine scheduling procedures to estimate seasonal irrigation requirements for soils of different water-holding capacities at six selected localities in British Columbia. The first procedure, described in detail by Wilcox and Sly, (Can. Dept. Agric. Tech. Bull. 83, 1974) closely follows the practices recommended for the Okanagan Valley. Four days are required to apply each 2.54 centimeters of water to the field. In the second procedure, equipment was assumed to be such that water would be applied to the entire field at the same time. The same basic principles are followed as with the first procedure, but adjustments were made to ensure that the same availability of soil water to plants prevailed under both methods. Differences in the irrigation requirements resulted from these adjustments. In every case, and for each water-holding capacity of the soil and each climatic condition, less water was required under the second scheduling method. (Skogerboe-Colorado State)

W76-00731

THE VALUE OF VEGETATION FOR CONSERVATION I. FOUR LAND AREAS IN BRITAIN,
Nature Conservancy, Grange-over-Sands (England). Merlewood Research Station.
For primary bibliographic entry see Field 2I.
W76-00736

THE VALUE OF VEGETATION FOR CONSERVATION II. M1 MOTORWAY AREA,
Nature Conservancy, Grange-over-Sands (England). Merlewood Research Station.
For primary bibliographic entry see Field 2I.
W76-00737

CHANGES IN ARTIFICIAL DRAINAGE, FERTILISERS, AND CLIMATE IN SCOTLAND,
Oxford Univ. (England). Dept. of Agricultural Science.
F. H. W. Green.
Journal of the Environmental Management, Vol 2, No 2, p 107-121, April 1974. 10 fig, 2 tab, 6 ref.

Descriptors: *Environmental effects, *Drainage effects, Drainage systems, Fertilization, *Fertilizers, Climatic data, *Climates.
Identifiers: *Scotland.

Current research has drawn attention to certain environmental changes, some natural and some man-made, which have been taking place concurrently in recent years, and which are affecting both water in streams, and the water level in the soil. Because the available data, on either side of the Border, were not strictly comparable, the former paper had to be restricted to England and Wales. The present paper deals with Scotland in a generally similar manner. The environmental changes considered are field drainage, use of fertilizers, and climatic changes. (Skogerboe-Colorado State)
W76-00742

AGRICULTURAL WASTE MANAGEMENT,
American Society of Civil Engineers, New York. Environmental Engineering Div.
For primary bibliographic entry see Field 5G.
W76-00744

GROUNDWATER SEMINAR, GRANADA.
Food and Agriculture Organization of the United Nations, Rome (Italy).
For primary bibliographic entry see Field 4B.
W76-00807

SOME FACTORS INFLUENCING GROUNDWATER DEVELOPMENT AND USE FOR AGRICULTURE,
Food and Agricultural Organization, Rome (Italy). Land and Water Development Div.
For primary bibliographic entry see Field 4B.
W76-00813

ACCRETION AND DILUTION OF NUTRIENTS IN YOUNG CORN, AS AFFECTED BY YIELD RESPONSE TO NITROGEN, PHOSPHORUS, AND POTASSIUM,
National Fertilizer Development Center, Muscle, Ala.
For primary bibliographic entry see Field 3C.
W76-00823

WATER RELATIONS OF COTTON. I. ROOT GROWTH AND WATER USE AS RELATED TO TOP GROWTH AND SOIL WATER CONTENT,
Agricultural Research Service, Auburn, Ala.
H. M. Taylor, and B. Klepper.
Agronomy Journal, Vol 66, No 4, p 584-588, July-August, 1974. 5 fig, 11 ref.

Descriptors: *Root development, *Root systems, Crop response, Moisture tension, *Moisture availability, Soil-water-plant relationships, *Cotton, Soil water.

Many experiments have evaluated the effects of decreasing soil water contents on top growth and yield of plants, but few experiments simultaneously have evaluated root growth. An experiment was conducted to determine the response of cotton roots and tops to decreasing soil water content. Plants were grown in rhizotron compartments with rainfall excluded by metal covers over the soil. Soil profile or irrigation schedule treatments provided different levels of soil and plant water potentials. Soil water content was determined with a neutron probe; rooting density, from measurements of roots on the glass viewing surface of each compartment. Plant water potential was determined with a pressure chamber apparatus, and top growth was evaluated by plant height. For conditions of this experiment, cotton root growth was correlated with decreases both in plant water potential and in soil water content. (Skogerboe-Colorado State)
W76-00824

MIXING IN SPRINKLER IRRIGATION SYSTEMS,
CH2M/Hill, Redding, Calif.
G. J. Hermann, G. M. McMaster, and D. W. Fitzsimmons.
Transactions of the ASAE (American Society of Agricultural Engineers), Vol 17, No 6, p 1020-1024, 1028, November-December, 1974. 6 fig, 9 ref.

Descriptors: *Sprinkler irrigation, *Irrigation practices, Irrigation, *Mixing, Irrigation water, Fertilization, Fertilizers, *Idaho, Flow.
Identifiers: Branching flow mixing.

A study was conducted at Aberdeen, Idaho, to determine the amount of mixing between two fluids traveling in a branching flow lateral under the field conditions found in a sprinkler irrigation system. The objective was to develop methods to predict the effects of state of flow, of couplers and of branching flow on mixing and dilution of chemical injected into operating sprinkler irrigation laterals. The resulting basic understanding of branching flow mixing could be used to manage chemical applications through sprinkler systems for best placement and effectiveness. Using irrigation systems to apply chemicals will reduce the usage of conventional application equipment and result in labor and energy savings as well as a reduction of soil compaction and crop damage. (Skogerboe-Colorado State)
W76-00834

EFFECT OF IRRIGATION AND WATER-TABLE DEPTH ON CROP YIELDS,
Agricultural Research Service, Mandan, N. Dak. Northern Great Plains Research Center.
R. F. Follett, E. J. Doering, G. A. Reichman, and L. C. Benz.
Agronomy Journal, Vol 66, No 2, p 304-308, March-April 1974. 3 fig, 1 tab, 15 ref.

Descriptors: *Water management, *Drainage, *Corn(Field), *Sugarbeets, *Alfalfa, Irrigation effects, Irrigation practices, Drainage practices, *Crop production.

The objective in this field study was to determine the most desirable combination of amount of irrigation and degree of drainage for production of corn, sugarbeets, and alfalfa grown on sandy soil over a declining water table. Irrigation was applied at weekly intervals at rates of either 0, 0.5, 1.0, or 1.5 times the water requirement of the crops as predicted by the modified Jensen-Haise equation. Irrigation amounts were applied in combination with shallow, medium, and deep drainage. In 1971 and 1972, early season depth to water table was 92 and 69 cm for the shallow drainage treatment, 166 and 145 cm for the medium, and 186 and 193 cm for the deep. Water-table declines were 94 and 96 cm during the 1971 and 1972 growing seasons, respectively, under all treatments. Corn was harvested at maturity, sugarbeets in mid-October, and alfalfa (three cuttings) at 1/10 bloom. Maximum yields of all crops occurred over the shallow water table; no yield response to irrigation was observed over the shallow water table. (Skogerboe-Colorado State)
W76-00837

PIPE SIZE SELECTION FOR COMMUNITY IRRIGATION SYSTEMS,
South Dakota State Univ., Brookings. Dept. of Agricultural Engineering.
S. T. Chu.
Transactions of the ASAE (American Society of Agricultural Engineers), Vol 17, No 6, p 1029-1032, 1037, November-December, 1974. 3 fig, 3 tab, 13 ref.

Descriptors: *Irrigation design, Irrigation engineering, Irrigation, *Pipelines, *Pipes, Piping systems, Economics, Community development, *Irrigation systems.

An analytical result and procedures to select optimal pipe sizes for the water delivery pipe network of community irrigation systems were developed. The application of the method to the Shamrock Irrigation Project showed that the result is an acceptable approximation of the result obtained by linear programming. The time required to use the method for selecting pipe sizes is less than the time needed to prepare computer cards for the linear programming. (Skogerboe-Colorado State)
W76-00839

4. WATER QUANTITY MANAGEMENT AND CONTROL

4A. Control Of Water On The Surface

MODEL DEVELOPMENT AND SYSTEMS ANALYSIS OF THE YAKIMA RIVER BASIN, MACRO MODEL SIMULATION.
Washington Univ., Seattle, Dept. of Civil Engineering.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-246 192, $4.75 in paper copy, $2.25 in microfiche. State of Washington Water Research Center, Pullman, Report No 17A, November 1974. 93 p, 11 fig, 7 tab, 7 ref, 2 append. Edited by B. W. Mar and W. R. Butcher. OWRT B-036-WASH (9), B-043-WASH (8), and B-050-WASH (8). 14-31-0001-3348, -3663, -3944.

Descriptors: *Washington, *Model studies, *Systems analysis, *Simulation analysis, Planning, Computer models, River basin development.
Identifiers: *Yakima River Basin(Wash), MACRO models.

Simple simulation (MACRO) models that contain a few parameters and that provide a gross representation of a river basin in space and time have the advantages of rapid construction and a transparent development process. These attributes are valuable when synthesizing and examining major linkages between more detailed models of various sectors of a river basin. The construction, theory, and application of MACRO models to integrate and evaluate the system analysis of the Yakima River Basin in presented and their utility demonstrated. (Bechard-Washington)
W76-00503

STUDIES ON OPERATIONS PLANNING AND CONTROL OF WATER DISTRIBUTION SYSTEMS,
Systems Control, Inc., Palo Alto, Calif.
For primary bibliographic entry see Field 6A.
W76-00506

INTERCEPTOR SEWERS AND SUBURBAN SPRAWL: THE IMPACT OF CONSTRUCTION GRANTS ON RESIDENTIAL LAND USE. VOLUME I, ANALYSIS.
Urban Systems Research and Engineering, Inc., Cambridge, Mass.
For primary bibliographic entry see Field 5D.
W76-00515

HYDROLOGY FOR ENGINEERS AND PLANNERS,
Missouri Univ., Columbia. Dept. of Civil Engineering.
For primary bibliographic entry see Field 2A.
W76-00531

BIBLIOGRAPHY OF HYDROLOGY, CANADA, 1971-1973.
International Association of Hydrological Sciences, Ottawa (Ontario).
For primary bibliographic entry see Field 10C.
W76-00532

OPTIMAL SIZING OF URBAN FLOOD-CONTROL SYSTEMS,
Hydrologic Engineering Center, Davis, Calif. Planning Analysis Branch.
D. W. Davis.
Journal of the Hydraulics Division, Proceedings of American Society of Civil Engineers, Vol 101, No HY8, Paper 11490, p 1077-1092, August 1975. 5 fig, 1 tab, 9 ref, 2 append.

Descriptors: *Computer models, *Simulation analysis, *Systems analysis, *Flood control, *Optimization, Urban hydrology, Hydrology, Hydraulics, Flood protection, Mathematical models, Cost analysis, Planning.
Identifiers: Economic feasibility.

Optimal sizes for components of urban flood-control systems can be determined from a detailed simulation analysis controlled by an optimization methodology. Flood-control measures within urban areas frequently consist of complex systems of detention storage reservoirs, channel modifications, levees, land-use controls, flood proofing, and pumping facilities. The optimal size of each of these system components depends on the system interaction with other components and the hydrologic, economic, environmental, and other performance outputs of the system. A technique has been developed and programmed for an existing model that automatically determines the sizes of urban flood-control components of detention storage, flow diversions, and pumping plants to maximize system net benefits. The system was simulated using hydrologic data, component cost and performance functions, and flow damage information at damage centers. (Terstriep-ISWS)
W76-00554

LARGE RURAL AREA ORGANIZES FOR POTABLE WATER,
For primary bibliographic entry see Field 5F.
W76-00618

THE FLOATING COVER: BEST WAY TO COVER A FINISHED-WATER RESERVOIR.
For primary bibliographic entry see Field 5F.
W76-00624

CONTROL OF WATER QUALITY IN TRANSMISSION AND DISTRIBUTION SYSTEMS,
Roanoke County Public Service Authority, Salem, Va.
For primary bibliographic entry see Field 5F.
W76-00633

A FOURTH DIMENSION--RECREATION AND AMENITY,
For primary bibliographic entry see Field 6B.
W76-00644

THE SURFACE WATER SUPPLY OF THE UNITED STATES, 1966-70: PART 4. ST. LAWRENCE RIVER BASIN--VOLUME 1. BASINS OF STREAMS TRIBUTARY TO LAKES SUPERIOR, MICHIGAN, AND HURON,.
Geological Survey, Reston Va.
For primary bibliographic entry see Field 7C.
W76-00651

EVALUATION OF EFFECTS OF LAND-USE CHANGES ON STREAMFLOW,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 4C.
W76-00657

FLOOD-HAZARD STUDY--100-YEAR FLOOD STAGE FOR APPLE VALLEY DRY LAKE, SAN BERNARDINO COUNTY, CALIFORNAI,
Geological Survey, Menlo Park, Calif.
M. W. Busby.
Available from the National Technical Information Service, Springfield Va. 22161. Water-Resources Investigations 11-75, June 1975. 40 p, 16 fig, 7 tab, 10 ref, 2 append.

Descriptors: *Flood plain zoning, *Flood frequency, *Deserts, *Californai, Playas, Land use, Construction, Flood protection, Flood forecasting, Peak discharge, Hydologic data, Synthetic hydrology.
Identifiers: *San Bernardino County(Calif), *Apple Vallye(Calif).

The 100-year flood stage for Apple Valley dry lake in Sa. Bernardino County, Calif., was developed by synthetic hydrologic techniques because adequate hydrologic or meteorologic data were not available for the basin. The 100-year flood stage was estimated to be at an elevation of 2,909.0 feet (886.7 metres) above mean sea level. Accelerated land developments during the past 10 years in the deserts of southern California may cause problems related to urban zoning. Much of the development consists of second or vacation-type homes, but also includes many expensive permanent residences. Desert playas or dry lakes oftern seem to be desirable development areas because of their flat topography and consequent abundance of good building sites. Although normally dry, playas commonly contain water after large storms, and homes built in and near the bottom of the playas can be subject to flooding. Because of this flooding potential, San Bernardino County is establishing flood-zoned areas on many playas. The boundary of the flood zone is defined by the 100-year water level--the water level that is exceeded, on the average, once in a 100-year period. (Woodard-USGS)
W76-00659

A HYDROLOGIC ASSESSMENT OF THE SEPTEMBER 14, 1974, FLOOD IN ELDORADO CANYON, NEVADA.
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 2E.
W76-00663

HYDROLOGY OF THE LAKE WINGRA BASIN, DANE COUNTY, WISCONSIN.
Geological Survey, Madison, Wis.
For primary bibliographic entry see Field 2H.
W76-00667

MAP SHOWING FLOOD-PRONE AREAS, COLORADO SPRINGS-CASTLE ROCK AREA, FRONT RANGE URBAN CORRIDOR, COLORADO,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 7C.
W76-00668

MAP SHOWING AVAILABILITY OF HYDROLOGIC DATA PUBLISHED AS OF 1974 BY THE U.S. ENVIRONMENTAL DATA SERVICE AND BY THE U.S. GEOLOGICAL SURVEY AND COOPERATING AGENCIES, COLORADO SPRINGS-CASTLE ROCK AREA, FRONT RANGE URBAN CORRIDOR, COLORADO,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 7C.
W76-00669

A LAND USE DECISION METHODOLOGY FOR ENVIRONMENTAL CONTROL,
Rocky Mountain Center on Environment, Denver, Colo.
For primary bibliographic entry see Field 6B.
W76-00683

ARIZONA STATE WATER PLAN, PHASE I: INVENTORY OF RESOURCE AND USES,
Arizona Water Commission, Phoenix.
For primary bibliographic entry see Field 6B.
W76-00700

INFLUENCE OF SOIL-WATER POTENTIAL ON THE WATER RELATIONSHIPS OF HONEY MESQUITE,
Texas State Technical Institute, Amarillo.
For primary bibliographic entry see Field 2D.
W76-00703

WATER POTENTIALS OF SALSOLA KALI L. AT DIFFERING LEVELS OF SUBSTRATE WATER AVAILABILITY,
Forest Service (USDA), Odgen, Utah. Intermountain Forest and Range Experiment Station.
For primary bibliographic entry see Field 2I.
W76-00705

TCA IN IRRIGATION WATER AFTER BANK TREATMENTS FOR WEED CONTROL,
Agricultural Research Service, Prosser, Wash. Irrigated Agriculture Research and Extension Center.
For primary bibliographic entry see Field 5B.
W76-00706

REHABILITATION OF LAND DISTURBED BY SURFACE MINING COAL IN ARIZONA,
Arizona Univ. Tucson. Dept. of Watershed Management.
For primary bibliographic entry see Field 5G.
W76-00709

EXECUTIVE SUMMARY OF CRITICAL WATER PROBLEMS FACING THE ELEVEN WESTERN STATES.
Bureau of Reclamation, Washington, D.C.
For primary bibliographic entry see Field 6B.
W76-00716

WESTWIDE STUDY REPORT ON CRITICAL WATER PROBLEMS FACING THE ELEVEN WESTERN STATES.
Bureau of Reclamation, Washington, D.C.
For primary bibliographic entry see Field 6B.
W76-00717

PLANT NUTRIENT LOSSES FROM TILE-OUTLET TERRACES,
Iowa State Univ., Ames. Dept. of Agronomy.
For primary bibliographic entry see Field 5B.
W76-00723

SIMULATION OF GAMMA-DISTRIBUTED FIRST-ORDER MARKOV CHAIN,
Department of the Environment, Ottawa (Ontario). Hydrology Research Div.
For primary bibliographic entry see Field 2E.
W76-00743

RATIONAL FORMULA NEEDS CHANGE AND UNIFORMITY IN PRACTICAL APPLICATION,
A. R. Pagan.
Water and Sewage Works, Vol 119, No 10, p 92-94, October, 1972. 5 fig.

Descriptors: *Hydrographs, *Flow rates, Storage, *Water storage, Mathematical studies, *Hydrograph analysis.

Modifications of mathematical procedure for the rational formula are suggested to get a more accurate representation of design peak flow rate and flood hydrograph representation. The modified procedure utilizes the basic concept that the rising limb of most flood hydrographs is steeper than the receding limb, implying that water goes into storage faster than it is removed from storage. (Sandoski-FIRL)
W76-00775

ROCHESTER'S STORMWATER DRAINAGE,
Humphreys (Howard) and Sons, London (England).
For primary bibliographic entry see Field 5D.
W76-00791

THE TREATMENT OF RAIN WATER. RAIN OVERFLOW, RAIN OVERFLOW BASINS, RAIN PURIFICATION TANKS, RAIN CATCHMENT BASINS (DIE BEHANDLUNG DE REGENWASSERS),
For primary bibliographic entry see Field 5D.
W76-00801

NON-LINEAR HYDROLOGICAL MODELS FOR CITY WATER DRAINAGE (NIGHT-LINEARE HYDROLOGISCHE MODELLE IN DER STADTENWAESSERUNG),
W. Koeniger.
Gas- und Wasserfach, Wasser/Abwasser, Vol 113, No 9, p 430-435, September, 1972. 13 fig, 30 ref.

Descriptors: *Sewerage, *Runoff forecasting, *Mathematical models, Surface runoff, Urban hydrology, Parametric hydrology, Model studies.
Identifiers: Germany.

A non-linear mathematical model of the urban surface runoff for the calculation of non-stationary runoff in sewer systems is presented. The calculations are based on general, simultaneous differential equations for the surface runoff, i.e. the continuity and the energy equations. The latter can be reduced to an equation for the resistance for stationary, uniform runoff which means that the surface runoff for a given interval can be regarded as quasistationary and locally uniform. The composite watershed is decomposed into surface elements with different successions of the runoff losses caused by them. The specific runoff obtained for the individual surface elements is then superposed to the corresponding surface elements. The input data of the mathematical model are geometrical and hydrological parameters such as wetting conditions, depth and distribution of surface depressions, surface roughness as well as trickling and evaporation characteristics, proportions, and average length and slope of the individual surface element types. Results indicate that variations in rainfall intensity with time are of substantial influence on the magnitude of the runoff peak. (Sandoski-FIRL)
W76-00802

THE TOTAL RUNOFF COEFFICIENT IN MIXED SEWER SYSTEMS (DER GESAMTABFLUSSBEIWERT IN MISCHKANALISATIONEN),
K. Krauth.
Gas- und Wasserfach, Wasser/Abwasser, Vol 113, No 7, p 329-331, July, 1972. 7 fig, 2 tab, 3 ref.

Descriptors: *Storm runoff, *Runoff coefficient, Rainfall-runoff relationships, Sewerage, Soil water, Runoff forecasting.
Identifiers: Germany.

Results from measurements of the total runoff coefficient in the Stuttgart-Buesnau sewerage treatment facility indicates that the average quantity of storm water which fails to run off was found to be 0.52 mm (0.85 mm in dry weather and 0.46 mm in moist soil). This quantity of results almost exclusively from losses due to soil wetting and in the form of puddle water. After the total runoff coefficient is reduced accordingly with respect to this loss, it becomes a constant value of about 1. Therefore it is surmized that the average storm runoff for an individual rainfall can be calculated from the quantity of the precipitation, less the losses due to wetting and puddle water. (Sandoski-FIRL)
W76-00803

ON APPLYING THE PRINCIPLE OF MAXIMUM ENTROPY TO HYDROLOGICAL PROBLEMS AND RUNOFF FORECASTING (O PRIMENENII PRINTSIPA MAKSIMUMA ENTROPPI V ZADACHAKH GIRDOLOGII I PROGNOZIROVANIYA STOKA),
I. V. Busalayev, and S. K. Davletgaliyev.
Meteorologiya i Gidrologiya, No 4, p 61-68, 1972. 2 fig, 1 tab, 10 ref.

Descriptors: *Runoff forecasting, Distribution patterns, Hydrologic data.
Identifiers: Entropy, Experimental data.

A method for evaluating the probabilities of runoff magnitudes by applying the principle of maximum entropy is suggested. The selection of the most adequate distribution is possible by means of this principle which exploits experimental data available as much as possible without introducing any redundancy. In this study the principle is applied to two different problems: (1) the determination of the distribution with available data on the first three moments; and (2) the selection of the most adequate distribution with a multitude of curves for one and the same accidental magnitude. It is concluded that the principle of maximum entropy should be applied whenever a multitude of distributions are available without experimental data being sufficient or existent. (Sandoski-FIRL)
W76-00804

CHARACTERISTICS AND COUNTERMEASURES AGAINST URBAN RIVER FLOODS (TOSHI KASEN NO SUIGAI NO TOKUSEI TO TAISAKU),
H. Takahide.
Kankyo Joho Kagaku, Vol 1, No 1, p 33-37, May, 1972. 1 fig, 5 tab.

Descriptors: *Flood control, *Rivers, Cities, Rural areas, Flood damage, Population, Drainage, Sewerage, Storm runoff.
Identifiers: Japan.

A projected picture of flood control facilities and river conditions in urban areas for 1972 shows that 11.4% of the entire urbanized area in Japan will be endangered by floods at every rain of more than 50 mm hour quantity. According to the investigations of the Ministry of Construction, the percentages of flooded houses in urban and rural areas between 1961 and 1967 show a clear pattern. Except for 1962 when the number of total flooded houses was distributed evenly between the urban and rural areas, the majority of flood damage was found in the cities, the most prominent case being 80% to 20% in 1963. Between 1960 and 1970, the total space of congested city area in Japan increased by 65% with an increase in population of 15 million. This statistic translates to 53.5% of the total population of Japan living in an urban environment. As of 1971, the ratio of reinforced rivers in urban areas averaged 17%, and only 25% of the total urban area has flooded prevention measures. An estimated $48.8 million will be needed between 1974 and 1980 in order to remodel all the rivers, drainage, and sewage systems in Japan to accomodate storm runoff. (Sandoski-FIRL)
W76-00805

CHOICE BETWEEN SURFACE AND GROUNDWATER FOR WATER SUPPLIES TO URBAN CENTRES,
Societe d'Etudes pour le Traitement et Utilisation des Eaux, Paris (France).
For primary bibliographic entry see Field 4B.
W76-00814

MINIMIZING THE SALT BURDENS OF IRRIGATION DRAINAGE WATERS,
Agricultural Research Service, Riverside, Calif. Salinity Lab.
For primary bibliographic entry see Field 3C.
W76-00828

A LABORATORY TEST OF SOME DRAIN TUBE FILTER MATERIALS,
McGill Univ., Montreal (Quebec).
For primary bibliographic entry see Field 8G.
W76-00832

EVALUATION OF SURFACE WATER RESOURCES FROM MACHINE-PROCESSING OF ERTS MULTISPECTRAL DATA,
Indiana State Univ., Terre Haute. Dept. of Geography and Geology.
For primary bibliographic entry see Field 5G.
W76-00833

MIXING IN SPRINKLER IRRIGATION SYSTEMS,
CH2M/Hill, Redding, Calif.
For primary bibliographic entry see Field 3F.
W76-00834

WATER RESOURCES OF WASHINGTON, A BIENNIAL REPORT TO THE LEGISLATURE, JANUARY 1975.
Washington State Dept. of Ecology, Olympia.
For primary bibliographic entry see Field 6B.
W76-00880+

DILUTION AND DECAY OF AQUATIC HERBICIDES IN FLOWING CHANNELS,
Commonwealth Scientific and Industrial Research Organization, Griffith (Australia). Div. of Irrigation Research.
For primary bibliographic entry see Field 5B.
W76-00895

THE 1973 FLOOD AND MAN'S CONSTRICTION OF THE MISSISSIPPI RIVER,
Saint Louis Univ., Mo. Dept. of Earth and Atmospheric Sciences.
C. B. Belt, Jr.
Science, Vol. 189, No. 4204, p 681-684, August 29, 1975. 6 fig, 15 ref.

Descriptors: *Flood flow, *Flood stages, *Mississippi River, Floods, Flood discharge, Flood peak, Navigable rivers, Levees, Stream erosion, Streambeds, Hydrology, Sediments, Geomorphology, Sediment transport, River beds, Rivers, Rating curves.
Identifiers: *Man's interference, *Stream constriction, Man-made modifications, Time trends, Maximum yearly stages, Minimum yearly stages.

The 1973 flood broke the stage (river level) records between Burlington, Iowa, and Cape Girardeau, Missouri, a distance of 562 km. At St. Louis, Missouri, the flood, which began March 10, continued for 77 consecutive days, exceeding the record set in 1844 when the river was in flood for 58 days during the entire year. The river crested at St. Louis on April 28, 1973 at a gage height of 13.18 m (4.03 m above flood stage) and a peak discharge of 24,100 cu m/sec. The stage topped the 189-year record by 0.3 m. The flood peak was 0.61 m higher in 1973 than in 1844 but the discharge was about 33% less than the estimated flow for 1844. The 1908 flood had the same flow as the 1973 flood but the peak was 2.51 m lower. The hydrographic data was analyzed to find out the reasons for record-breaking stages. The study concludes that the progressive constriction of the Mississippi for navigation since 1837 has caused bottom erosion in some stretches. In others, the bottom oscillates up and down with time. The high stages rise much more rapidly. Constriction of the river channel causes flooding and makes floods higher, thus navigation works degrade the protection afforded by levees. The combination of navigation works and levees causes significant rises in the stages of floods. Additional channel constriction and levee building will cause further problems. The 1973 flood's record was man-made. (Lee - ISWS)
W76-00901

MATHEMATICAL SIMULATION OF GROUND-WATER ABSTRACTION FROM CONFINED AQUIFERS FOR RIVER REGULATION,
Department of the Environment, Reading (England). Central Water Planning Unit.
For primary bibliographic entry see Field 2F.
W76-00904

JET DISCHARGE INTO A STRATIFIED RESERVOIR,
San Jose State Univ., Calif. Dept. of Mechanical Engineering.
For primary bibliographic entry see Field 8B.
W76-00911

PERMITS FOR ACTIVITIES IN NAVIGABLE WATERS OR OCEAN WATERS.
For primary bibliographic entry see Field 8A.
W76-00945

PIERCE V. RILEY (ACTION BY RIPARIAN OWNERS FOR INJUNCTION TO PROVIDE ACCESS TO LAKE).
219 N. W. 2d 434 (Mich 1974).

Descriptors: *Riparian rights, *Canal construction, *Judicial decisions, *Michigan, Land tenure, Land resources, Canals, Bodies of water, Lakes, Water demand, Water resources development, Water law, Water management(Applied), Civil engineering.
Identifiers: *Injunctive relief.

An action was brought by riparian owners for a declaration of rights and injunctive relief against owners of a lot on which a canal had been constructed to provide access to the lake for ninety nonriparian lots. The lower court granted plaintiff's injunction but refused plaintiff's request to order the canal filled. On appeal the Supreme Court reversed, and held that the cause should be held in abeyance pending findings of fact and a decision by the Department of Natural Resources on an application by defendents pursuant to the Inland Lakes and Streams Act of 1972. (Proctor-Florida)
W76-00976

OMERNIK V. STATE OF WISCONSIN (APPEAL FROM CONVICTION FOR DIVERSION OF WATERS FROM LAKES AND STREAMS WITHOUT A PERMIT).
218 N. W. 2d 734 (Wis 1974).

Descriptors: *Wisconsin, *Alteration of flow, *Relative rights, *Diversion, Judicial decisions, Routing, Prior appropriateion, Riparian rights, Water management(Applied), Water utilization, Navigable waters, Streams, Lakes, Bodies of water, Water resources development, Water law, Legislation, Constitutional law.
Identifiers: Liability(Legal aspects).

By a judgment of the county court, the defendant was convicted of violations of a statute prohibiting the diversion of waters from lakes and streams without a permit. The Circuit Court affirmed. On appeal the Supreme Court of Wisconsin held that the statute applied to both navigable and non-navigable streams. The permit requirement set forth by the legislature was not limited to stream-to-stream diversion. The court further held that the statue did not deny the appellant equal protection of the law with respect to the categories of water use coverage and did not constitute the taking of property without just compensation. (Proctor-Florida)
W76-00977

BOONE V. TILLATOBA CREEK DRAINAGE DISTRICT (SUIT SEEKING INJUNCTIVE RELIEF WITH RESPECT TO PROPOSED DRAINAGE PROJECT).
For primary bibliographic entry see Field 6E.
W76-00981

4B. Groundwater Management

STUDIES ON OPERATIONS PLANNING AND CONTROL OF WATER DISTRIBUTION SYSTEMS,
Systems Control, Inc., Palo Alto, Calif.
For primary bibliographic entry see Field 6A.
W76-00506

GROUND WATER POLLUTION FROM SUBSURFACE EXCAVATIONS: PART V, OTHER TYPES OF WELLS.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5B.
W76-00525

GROUND WATER POLLUTION FROM SUBSURFACE EXCAVATIONS. PART IX, LANDFILLS.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5B.
W76-00526

GROUND WATER POLLUTION FROM SUBSURFACE EXCAVATIONS, PART X, SEWER LEAKAGE.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5B.
W76-00527

GROUNDWATER POLLUTION FROM SUBSURFACE EXCAVATIONS, PART XI, TANK AND PIPELINE LEAKAGE.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5B.
W76-00528

WATER RESOURCES OF HANCOCK COUNTY WITH EMPHASIS ON GROUND-WATER AVAILABILITY,
Indiana Dept. of Natural Resources, Indianapolis. Div. of Water.
For primary bibliographic entry see Field 7C.
W76-00534

THE ASSESSMENT OF REGIONAL GROUND-WATER SCHEMES BY RIVER-FLOW REGRESSION EQUATIONS,
Department of the Environment, Reading (England). Central Water Planning Unit.
C. E. Wright.
Journal of Hydrology, Vol 26, No 3/4, p 209-215, August 1975. 4 fig, 4 ref.

Descriptors: *Regional analysis, *Regression analysis, *River flow, *Groundwater, *Pumping, Wells, Regulated flow, Flow measurement, Equations, Flow rates, Gaging stations, Data collections, Recession curves, Aquifer characteristics, Withdrawal, Overdraft, Base flow.
Identifiers: *England, *Pumping schemes, Error of estimate, Skewness.

Artificial changes in river flow, such as those caused by groundwater abstraction, can be assessed by means of flow regression equations provided that adequate flow records exist and abstraction rates are sufficiently high. Experimence in a number of group pumping tests has indicated that the ratio of groundwater abstraction to the standard error of estimate of the equation used to estimate artificial flow changes is critical to the reliability of the test results. This ratio should ideally be considered in the design stage of tests to ensure the meaningful results are obtained. (Visocky-ISWS)
W76-00548

GROUND-WATER RECHARGE SIMULATION,
New South Wales Univ., Kensington (Australia). Faculty of Military Studies.
For primary bibliographic entry see Field 2F.
W76-00555

HYDROSALINE REGIME OF SOME SOILS IN THE MIDDLE PART OF THE CALMATUI RIVER BASIN. (IN RUMANIAN),
Institutul de Studii si Cercetari Pedologie, Bucharest (Rumania).
For primary bibliographic entry see Field 2G.
W76-00573

GROUND-WATER LEVELS IN THE UNITED STATES, 1969-73: SOUTH-EASTERN STATES.
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 7C.
W76-00652

GROUND-WATER BASIC DATA FOR GRANT AND SIOUX COUNTIES, NORTH DAKOTA,
Geological Survey, Bismarck, N. DAK.
For primary bibliographic entry see Field 7C.
W76-00653

ARTIFICIAL RECHARGE IN THE UPPER SANTA ANA RIVER AREA, SAN BERNARDINO COUNTY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
D. H. Schaefer, and J. W. Warner.
Available from NTIS, Springfield, Va 22161 PB-245-589 as price $3.75 printed copy; $2.25 microfiche. Water-Resources Investigations 15-75, July 1975. 27 p, 8 fig, 1 tab, 8 ref.

Descriptors: *Artificial recharge, *Water spreading, *Imported water, *Hydrogeology, *California, Aquifer characteristics, Groundwater movement, Infiltration rates, Forecasting, Water resources development, Water supply, Test wells, Drilling, Lithologic logs, Water yield, Water level fluctuations, Ground- water barriers, Groundwater potential, Faults(Geologic).
Identifiers: *San Bernardino County(Calif).

The San Bernardino Valley, California Municipal Water District began receiving its initial entitlement of 46,000 acre-feet per year of imported northern California water in December 1972. By 1990, the district will be receiving 102,000 acre-feet per year. Plans are to distribute this imported water for artificial recharge to the local groundwater system. The upper Santa Ana River area is well suited for artificial recharge because it is largely underlain by permeable river-channel deposits. Analyses of groundwater movement during current water-spreading operations, test-drilling data, and application of Baumann's (1965) equation for calculating the theoretical size of the recharge mound indicate that (1) barriers to groundwater movement are not evident in the river-channel deposits, (2) depth to the basement complex is less in the area of the eastern spreading basins than in the western basins, (3) the spreading grounds would be capable of accepting a combined total of as much as 80,000 acre-feet per year, and (4) the water being recharged should move through the part of the aquifer composed of river-channel deposits toward the areas of pumpage. (Woodard-USGS)
W76-00655

GROUND-WATER QUALITY BENEATH SOLID-WASTE DISPOSAL SITES AT ANCHORAGE, ALASKA,
Geological Survey, Anchorage, Alaska.
For primary bibliographic entry see Field 5B.
W76-00656

GROUND-WATER QUALITY IN INDIAN WELLS VALLEY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 5A.
W76-00658

THE GROUND-WATER SITUATION IN THE CIRCLEVILLE AREA, PICKAWAY COUNTY, SOUTH-CENTRAL OHIO,
Geological Survey, Columbus, Ohio.
S. E. Norris.
Ohio Department of Natural Resources, Columbus, Report of Investigations No 96, 1975. 14 p, 6 fig, 1 tab, 5 ref.

Descriptors: *Groundwater resources, *Well data, *Aquifer characteristics, *Ohio, Hydrologic data, Water yield, Pumping, Withdrawal, Water utilization, Groundwater movement, Groundwater recharge, Water levels.
Identifiers: Pickaway County(Ohio).

In the Circleville area in Pickaway County, south-central Ohio, industrial wells yield 8 million gallons per day from sand and gravel outwash deposits in the Scioto River valley. Groundwater levels in the pumped area have been declining since pumping began in the mid-1950's, from 40 to 45 feet below land surface to 75 to 80 feet near the center of the cone of influence. Transmissivities at two closely spaced pumping centers were determined by analysis of the cone as 3,575 and 6,100 feet squared per day respectively. The hydraulic conductivity of the sand and gravel deposits is about 60 feet per day. The wells are relatively far from the Scioto River, and most of the water withdrawn is from regional underflow, which is intercepted in transit to the stream. Yields of wells closest to the river are sustained, in part, by induced infiltration. This component is expected to increase as the cone of influence grows in response to withdrawal by industry. For optimum use of the aquifer, future pumping could be spread over a larger area, and the new wells could be drilled outside the present cone of influence. Elsewhere in the Circleville area, sites are underlain by excellent aquifers, which are capable of yield much more water than is being withdrawn at the present time. (Woodard-USGS)
W76-00661

SUMMARY APPRAISALS OF THE NATION'S GROUND-WATER RESOURCES-UPPER COLORADO REGION,
Geological Survey, Reston, Va.
For primary bibliographic entry see Field 2F.
W76-00662

POTENTIAL OF MADISON GROUP AND ASSOCIATED ROCKS TO SUPPLY INDUSTRIAL WATER NEEDS, POWDER RIVER BASIN, WYOMING AND MONTANA,
Geological Survey, Denver, Colo.
F. A. Swenson.
In: Water Resources Problems Related to Mining: American Water Resources Association Proceedings Series No 18, p 210-218, June 1974. 5 fig, 4 ref.

Descriptors: *Groundwater resources, *Water quality, *Industrial water, *Wyoming, *Montana, Water resources development, Aquifer characteristics, Hydrologic data, Data collections, Water wells, Water yield, Chemical analysis, Water supply, Groundwater potential, Geology, Hydrogeology.
Identifiers: *Powder River Basin(Wyo-Mont).

A large part of the Nation's energy reserves are in the coal deposits of the Powder River Basin in Wyoming and Montana. One of the limiting factors of industrial development of these great energy reserves is the availability of water. Surface-water supplies that have not been appropriated for other uses within the basin are limited. A reconnaissance study began in July 1973 to assess the potential of the Madison Group and other deep carbonate aquifers to supply water needs for energy development of the Powder River strutural basin that lies between the Black Hills and the Bighorn-Pryor Mountains, extending from about Casper, Wyoming, to the Yellowstone River in Montana. Maps have been prepared of this area showing (1) thickness of Madison Group, plus additional carbonate aquifers underlying and in hydrologic continuity with Madison, (2) structure contours showing top of Madison Group, (3) potentiometric map showing the heights to which water will rise in tightly cased wells bottomed in the Madison and other carbonate aquifers, and (4) a map showing lines of equal dissolved-solids concentration in water from the carbonate aquifers. About 40 water wells, some yielding more than 9,000 gallons per minute, with maximum depths exceeding 10,000 feet have been completed. The good quality of the water (for example, 860 milligrams per litre dissolved solids in water from a depth of 8,000 feet and 80 miles from area of recharge) tends to indicate good circulation of water. It appears that signficant quantities of water can be made available from these deep aquifers for industrial development of the energy reserves of this area. (Woodard-USGS)
W76-00666

MAP SHOWING AVAILABILITY OF HYDROLOGIC DATA PUBLISHED AS OF 1974 BY THE U.S. ENVIRONMENTAL DATA SERVICE AND BY THE U.S. GEOLOGICAL SURVEY AND COOPERATING AGENCIES, COLORADO SPRINGS-CASTLE ROCK AREA, FRONT RANGE URBAN CORRIDOR, COLORADO,
Geological Survey, Denver, Colo.
For primary bibliographic entry see Field 7C.
W76-00669

SCREEN THEORY FOR WELLS AND SOIL DRAINPIPES,
Iowa State Univ., Ames. Dept. of Agronomy.
For primary bibliographic entry see Field 8B.
W76-00734

GROUNDWATER SEMINAR, GRANADA.
Food and Agriculture Organization of the United Nations, Rome (Italy).
FAO Irrigation and Drainage Paper No 18. Report of the FAO/UNDP Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, Spain, October 18-23, 1971. Published by FAO in 1973, 293 p.

Descriptors: *Groundwater, Groundwater movement, *Groundwater mining, *Optimum development plans, *Irrigation, *Water wells, *Water management(Applied), Hydraulics, Hydrology, *Water resources development, *Conjunctive use, Costs, Economics, Planning.

The working papers and the discussion which took place during the Seminar centered on four principal subjects: (1) Physical bases for the use of groundwater reservoirs; (2) Technical, economic, legal and institutional problems of groundwater utilization for agriculture and urban supply; (3) Examples of planning of hydrogeological investigations and of big scale projects of groundwater exploitation; (4) Systems analysis techniques for optimal utilization of hydraulic resources. (See also W76-00808 thru W76-00820)
W76-00807

THE ROLE OF GROUNDWATER IN SPAIN,
National Geology Commission, Madrid (Spain); and Guadalquivir Project, Madrid (Spain).
J. A. Gomez Angulo.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 37-51, 7 tab.

Descriptors: *Groundwater mining, *Water resources development, *Arid lands, *Water budget, Groundwater, Groundwater basins, Agriculture, Irrigation, Reservoir storage, Wells, Hydrologic budget, Water resources, Water supply, Groundwater availability.
Identifiers: *Spain(Guadalquivir Project).

Spain hopes to increase groundwater's share of its total water budget from 20% to 50%. While the nation's total groundwater reserves are as yet unknown, those of the Guadalquivir and Segura Basins suggest that these reserves greatly exceed the storage capacity of surface reservoirs that now exist or that may be built in the future at competitive prices. Allowing for artificial recharge operation, groundwater, in close association with surface water and in superior conditions of competition with it, should constitute the basis of Spain's hydrological policy up to the year 2000. Thus, mining groundwater will become increasingly important and necessary for Spain. (See also W76-00807) (Bowden-Arizona)
W76-00808

GROUNDWATER RESERVOIRS: PHYSICAL BASES FOR THEIR USE,
Bureau de Recherches Geologiques et Minieres, Paris (France). Office of Geological and Mineral Research.
J. Margat.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 52-66.

Descriptors: *Groundwater, *Groundwater mining, *Aquifers, *Water management(Applied), *Aquifer characteristics, *Aquifer management, Overdraft, Recharge, Safe yield, Water resources development, Water budget, Boundaries(Surface), Geohydrologic units, Groundwater recharge, River basin development, Water resources, Water supply, River basins, Streams.

It is today conceivable and technically feasible to plan the tapping of an aquifer and to integrate its management in the broader framework of optimization of use of all water resources of a river basin or a territory. The study of an aquifer for the purpose of assessing its potentialities and uses that are justifiable by economic or financial calculations must be based essentially on research on the following physical data: the geometry of the reservoir; conditions at the confines, in particular its connection with streams and the sources of such streams; its lithology; hydrodynamic conditions; order of magnitude of the reserves; order of magnitude of the natural discharge and replenishment fluctuation pattern. (See also W76-00807) (Bowden-Arizona)
W76-00809

RECHARGING OF UNDERGROUND WATER DEPOSITS,
P. Ruby.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 67-74.

Descriptors: *Recharge, *Water pollution, *Aquifer management, *Aritificial recharge, *Saline water intrustion, Groundwater, Safe yield, Overdraft, Water management(Applied), Aquifers, Injection wells, Groundwater recharge, Natural recharge, Infiltration, Storage coefficient, Hydrogeology, Aquifer characteristics, Groundwater basins, Hydrologic aspects, Hydrologic data, Water quality, Geohydrology.
Identifiers: Hydrogeologic survey.

Water is artificially recharged into grounwater deposits when human exploitation exceeds natural recharge, when the artificially recharged water is polluted and the soil acts as a filter, when the aquifer is used as storage for surplus surface water, and when salt water intrusions threaten fresh water aquifers. A review of costs for artificial recharging around the world shows that expenses vary a great deal. Generally, such recharge schemes are site specific and necessitate a thorough knowledge of local factors. However, one thing is needed in every case if one wishes to move away from the empiricism which has only too frequently governed the development of systems for the artificial recharging of water deposits: a good knowledge of these deposits, i.e. the carrying out of a serious hydrogeological survey of the reservoirs and a careful hydrological and physical/chemical survey of the fluid to be injected. (See also W76-00807) (Bowden-Arizona)
W76-00810

TECHNICAL, ECONOMIC AND ORGANISATIONAL ASPECTS OF THE EXPLOITATION OF GROUNDWATER RESOURCES,
Gaudalquivir Project, Madrid (Spain).
A. Bouton.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 75-90, 2 tab.

Descriptors: *Well drilling, *Rotary drilling, *Drilling equipment, *Water management(Applied), *Groundwater, Costs, Core drilling, Drilling, Casings, Drillers logs, Drilling fluids, Subsurface investigations, Clays, Aquifers.
Identifiers: Spain(Guadalquiver Project).

Although crude drilling techniques limited the exploitation of many aquifers in the past, modern methods and machinery have greatly expanded the number and kind of aquifers which can now be exploited. Cost of the water, based on the price of the drilling equipment, life of the well, and volume of water obtained are the major factors in determining whether drilling is viable. Costs and practices of drilling work of different nations are given. To insure that groundwater resources be protected, an official drilling authority, professional training, industrialization, and appropriate legislation area suggested. (See also W76-00807) (Robinett-Arizona)
W76-00811

GROUNDWATER RESOURCES: EVALUATION AND EXPLOITATION,
Arizona Univ., Tucson. Dept. of Geoscience.
J. W. Harshbarger.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 91-118, 25 ref.

Descriptors: *Groundwater, *Groundwater mining, *Water management(Applied), *Sustained yield, *Aquifer management, Safe yield, Water resources development, Subsurface investigations, Overdraft, Recharge, Models, Computer models, Irrigation, Agriculture, Aquifer characteristics, Wells, Aquifers.

The concept of safe yield in the development and management of groundwater reservoirs has been supplanted by that of sustained yield, based on replenishment factors, aquifer mechanics techniques, and interception of discharge components. Data obtained from projects designed for aquifer appraisal can be examined with analytical and computer model simulation, its accuracy being dependent upon the reliability of the data used in the simulation of the water system. It is necessary not only to consider surface and groundwater sources together as a total resources, but to maintain data, assessment, and interpretation on a continuing basis. (See also W76-00807) (Paylore-Arizona)
W76-00812

SOME FACTORS INFLUENCING GROUNDWATER DEVELOPMENT AND USE FOR AGRICULTURE,
Food and Agricultural Organization, Rome (Italy). Land and Water Development Div.
C. E. Houston.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 119-144, 16 ref.

Descriptors: *Water law, *Irrigation, *Groundwater mining, *Water management(Applied), Legislation, Groundwater, Groundwater basins, Water resources development.

Improved use of present water supplies and development of additional supplies for irrigation will be necessary to provide the increased food supplied needed in future decades. Groundwater is the most plentiful source of fresh water but all waters should be considered as one common resource. Insistence upon the total approach will require the expeditions use of a large number of essential complementary inputs. Groundwater development for agriculture has some decided advantages over surface water development. There is a need for national groundwater policies concerning investigations, utilization, and conservation, the maximum use of the resource. There is also a need for new legislation for controling investigation, recovery and utilization of groundewater. This, too, should be aimed at the most beneficial and maximum use of the resources. Finally, successful irrigation requires the skillful combination of accumulated knowledge in many professional fields, including: engineering; water, soil and plant sciences; economics; and other social sciences. Preparation of project proposals and their appraisal, as well as project implementation and management call for experienced judgement based on a high degree of professional competence. A major argument for careful planning of groundwater exploitation has been the experience and problems rampant in arid lands. (See also W76-00807) (Bowden-Arizona)
W76-00813

CHOICE BETWEEN SURFACE AND GROUNDWATER FOR WATER SUPPLIES TO URBAN CENTRES,
Societe d'Etudes pour le Traitement et Utilisation des Eaux, Paris (France).
C. Gomella.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 145-165, 4 fig.

Descriptors: *Groundwater, *Urban hydrology, *Surface waters, *Conjunctive use, *Economic justification, Water pollution, Surface-groundwater relationships, Economic feasibility, Surveys, Hydrologic data, Water quality, Water treatment, Water resources, Water purification, Potable water, Water sources, Water supply, Water storage, Groundwater resources, Water utilization.

Groundwater is generally water of high quality requiring no treatment. Surface supplies range from high quality water requiring conventional processing such as coagulation, decantation, filtration, and careful sterilization, to water of poor quality whose processing and use are not even practical. An economic survey was carried out between high quality groundwater (requiring no treatment) and high quality water which requires minimum treatment. Groundwater was the most economical for urban water supplies. (See also W76-00807) (Robinett-Arizona)
W76-00814

THE ROLE OF GROUNDWATER IN THE OPTIMUM UTILIZATION OF WATER RESOURCES,
Guadalquivir Project, Madrid (Spain).
F. Mortier.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971. Irrigation and Drainage Paper No 18. Rome, 1973, p 166-185.

Descriptors: *Groundwater, *Surface waters, *Conjunctive use, *Planning, Water management(Applied), Surface-groundwater relationships, Water resources development, Aquifers, Optimization, Water utilization.

Optimum utilization of water resources is defined as that which makes use of resources which are limited and variable qualitatively and quantitatively in time and space, adequately and at least cost to the community. In a comparison of the characteristics of surface and underground water, stratification, water quality, flow, and exploitation are described; while the role of groundwater in the optimum utilization of water resources focuses on the role of storage, regularization, and conveyance, as well as the economic role of the exploitation of groundwater. In discussing the com-

bined use of surface and underground water resources, examples in California, the Indus Basin, and Mancha in Spain are presented. The postulate justifying the combined utilization of water resources is that the total of economically exploitable resources can be increased, with the advantages of this conjunctive use being a larger storage capacity, profiting by the transport role played by aquifers, possibility of development in states, and the knowledge that winter use of surface water for power generation can be offset in summer when agricultural needs are met by winter groundwater recharge. Drawbacks include mineralization, costs, technical difficulties, complicated management. (See also W76-00807) (Paylore-Arizona)
W76-00815

MODELS FOR GROUNDWATER ANALYSIS,
Harvard Univ., Cambridge, Mass.
M. B. Fiering.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971. Irrigation and Drainage Paper No 19. Rome, 1973, p 186-195.

Descriptors: *Groundwater, *Model studies, *Simulation analysis, *Synthetic hydrology, *Mathematical models, Planning, Computer models, Hydraulic models, Optimization, Irrigation programs, Reservoir operation, Aquifer management, Continuity equation.

The role of computers, mathematics, and of operations research, and relationships between prototype problems and their mathematical counterparts in groundwater analysis are discussed. Several cases in an irrigation program are used to present solutions based on these model calculations, consisting of sets of decisions meeting constraints and optimizing the objective functions. In case 1, the objective is to maximize the net benefits, consisting of the agricultural benefit minus the recreation loss minus the total costs, all subject to certain constraints, most of which describe reservoir storage-release, aquifer storage-withdrawal, and the law of continuity. Case 2 adds a budgetary constraint, where the objective function is to maximize gross benefits, resulting in a solution differing from that obtained for Case 1. Case 3 seeks to minimize the total cost and demonstrate at the same time that optimization is not necessarily maximization. A distinction is made between solution and decision, where the optimal decision is the set of variables and the optimal solution is the value of the objective function associated with these optimal decisions. A small change in the decision can produce a large change in a solution, and vice versa. Clearly such groundwater analyses are of the highest value in arid lands where water scarcity multiplies the worth of hydrologic resources. (See also W76-00807) (Paylore-Arizona)
W76-00816

SIMULATION MODELS FOR CONJUNCTIVE USE OF SURFACE AND GROUNDWATER,
Harvard Univ., Cambridge, Mass.
M. B. Fiering.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Goverment of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 196-222, 17 fig, 1 tab.

Descriptors: *Groundwater, *Conjunctive use, *Surface-groundwater relationships, *Model studies, *Synthetic hydrology, Asia, Computers, Mathematical models, Simulation analysis, Economics, Economic prediction, Aquifer characteristics, Aquifer management, Water resources development.
Identifiers: *Pakistan, Indus River(Pakistan).

A simulation model for the plain of the Indus River in West Pakistan is used to describe the conjunctive use of surface and groundwater with an objective of maximization of agricultural productivity. The mathematical problem was to determine the proper setting for making the proper investment decisions. Seven basic assumptions wwere made in the simulation: (1) the surface and groundwater elevations are assumed to be horizontal in the area; (2) the depth to groundwater is everywhere uniform in the zone subtended by a single well; (3) the seasonal inputs of flow and precipitation are presumed to derive from bivariate log-normal distributions; (4) the feedback relationships can be represented by a deterministic component with a suitably distributed random additive component; (5) all depth-dependent flow vectors are initially approximated using the groundwater depth; (6) the ground surface and the bottom of the aquifer provide boundaries beyond which groundwater cannot migrate; and (7) all accretions and withdrawals from the groundwater occur uniformly over the entire area. (See also W76-00807) (Robinett-Arizona)
W76-00817

APPLICATION OF SYSTEMS ANALYSIS MODELS TO THE PROBLEM OF CONJUNCTIVE USE OF SURFACE AND GROUNDWATER IN THE VEGA OF GRANADA,
Instituto Geologico y Minero de Espana, Madrid.
D. Alvarez Fernandez, R. J. Delucia, M. B. Fiering, D. F. Luecke, and Q. T. Nguyen.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 223-262, 9 fig, 1 tab.

Descriptors: *Groundwater, *Conjunctive use, *Surface waters, *Surface-groundwater relationships, *Model studies, *Systems analysis, Europe, Computers, Synthetic hydrology, Mathematical models, Simulation analysis, Aquifer management, Water resources development, Water management(Applied), Optimal development plans.
Identifiers: *Spain, Vega of Granada(Spain), High Genil Basin(Spain).

A combination of systems analysis techniques were utilized on problems of conjunctive use of surface and groundwater in the Vega of Granada, Spain. The study introduced the use of systems methodology to the planning efforts for this area and developed a set of models which demonstrated the usefulness of these techniques and should provide the basis for aiding in the definitive selection of the joint surface and groundwater development options. The techniques employed were those of storage yield analysis using synthetic hydrology and mathematical programming models to examine both capacity and operation questions. Initial programming solutions combined with the storage yield analysis indicate that the range of attractive alternatives appears to consist of significant development of the groundwater resources but only very limited extensions of the surface water capacity in certain sub-areas. The ability of systems analysis models to examine the many simulation tradeoffs that must be made in selecting the optimal development plan for such systems had been demonstrated in a growing number of water resources systems over the last decade. This study should be an initial step in the introduction of these techniques into the planning process in Spain. (See also W76-00807) (Bowden-Arizona)
W76-00818

COMPUTATION OF ECONOMIC DATA CONCERNING THE EXPLOITATION OF GROUNDWATER ON A REGIONAL SCALE,
Northern Sahara Water Resources Study Project, Alger (Algeria).
P. Pallas, V. Pietraru, and D. Huault.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Government of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 263-285, 3 fig, 4 tab.

Descriptors: *Economics, *Groundwater, *Africa, *Model studies, *Water resources development, Mathematical models, Economic feasibility, Planning, Water management(Applied), Aquifer managment, Water yield, Wells, Costs, Water utilization, Groundwater resources, Synthetic hydrology, Water wells, Water supply.
Identifiers: Sahara, Sahara Desert.

In order to provide information on the investment and operating costs involved in the exploitation of groundwater on the scale of a region located in the Northern Sahara, a computational method was developed that makes it possible to transform data provided by hydraulic mathematical models into economic terms. The proposed computation may be subdivided into: computation of the real water level in a well from the level calculated for one square in the grid by means of prediction models; computation for one square in the grid of the number of wells that is necessary in order to obtain the required quantity of water and choice of the economically most advantageous variant (artiesian or pumped); economic computation on the regional scale, yielding a calendar of investments for water production and the mean cost per cubic meter of water and its variation with time. (See also W76-00807) (Bowden-Arizona)
W76-00819

SOME ASPECTS OF GROUNDWATER EXPLOITATION AND THE USE OF GROUNDWATER MODEL IN THE MIRES BASIN IN CRETE, GREECE.
In: Groundwater Seminar, Granada, Report of the FAO/UNDP-Goverment of Spain Seminar on the Role of Groundwater in the Optimal Utilization of Hydraulic Resources, Granada, October 18-23, 1971, Irrigation and Drainage Paper No 18. Rome, 1973, p 286-290.

Descriptors: *Groundwater, *Irrigation, *Economic feasibility, *Water resources development, *Model studies, Agriculture, Europe, Water management(Applied), Computers, Systems analysis, Mathematical models, Synthetic hydrology, Aquifer management, Water supply, Groundwater resources, Water utilization, Aquifer characteristics, Groundwater basins, Hydrologic aspects, Hydrologic subject.
Identifiers: *Greece, *Crete, Messara Valley(Crete).

The groundwater basin of Mires in the Messara Valley on the Island of Crete has an average annual groundwater flow of approximately 26 cubic hectometer out of which only about 5hm3 are being used at present. The full exploitation of the annual flow would allow irrigation of more than two times the surface of the basin area. The question is whether it will be technically and economically feasible to reach this aim, the crucial point being the pumping pattern. As an approach to the answer a digital groundwater model has been used which enabled simulation of the reactions of the hydrogeological system on varying conditions of exploitation. (See also W76-00807) (Bowden-Arizona)
W76-00820

ASSESSING SOIL SALINITY AND IDENTIFYING POTENTIAL SALINE-SEEP AREAS WITH FIELD SOIL RESISTANCE MEASUREMENTS,
Agricultural Research Service, Sidney, Mont.
For primary bibliographic entry see Field 3C.
W76-00835

WISCONSIN'S GROUNDWATER: AN INVALUABLE RESOURCE,
Wisconsin Univ., Madison. Cooperative Extension Programs.
For primary bibliographic entry see Field 2F.
W76-00881

NUMERICAL MODEL OF FLOW IN A STREAM-AQUIFER SYSTEM,
Colorado State Univ., Fort Collins.
For primary bibliographic entry see Field 2F.
W76-00882

GROUND-WATER LEVELS, 1968-1972,
Oregon State Engineer's Office, Salem.
For primary bibliographic entry see Field 7C.
W76-00887

SUMMARY OF GROUND WATER QUALITY IN THE LOS ANGELES DRAINAGE PROVINCE,
California Dept. of Water Resources, Los Angeles. Southern District.
For primary bibliographic entry see Field 7C.
W76-00888

ENVIRONMENTAL ISOTOPIC STUDY OF THE BARREMIAN-JURASSIC AQUIFER IN SOUTH DOBROGEA (ROUMANIA),
Institutul de Meteorologie si Hidrologie, Bucharest (Rumania).
For primary bibliographic entry see Field 2F.
W76-00894

THE USE OF ENVIRONMENTAL TRITIUM TO ESTIMATE RECHARGE TO A SOUTH-AUSTRALIAN AQUIFER,
Commonwealth Scientific and Industrial Research Organization, Glen Osmond (Australia). Div. of Soils.
For primary bibliographic entry see Field 2F.
W76-00896

OCCURRENCE AND DISTRIBUTION OF POTASSIUM IONS IN NATURAL WATERS IN INDIA,
Soil Research Lab., Chandigarh (India).
For primary bibliographic entry see Field 5B.
W76-00897

CHLORIDE CONTAMINATION IN ALUM CREEK, CENTRAL OHIO.
Ohio State Univ., Columbus. Dept. of Geology and Mineralogy.
For primary bibliographic entry see Field 5B.
W76-00910

TEMPLETON V. HUSS (ACTION FOR INJUNCTIVE RELIEF FOR INCREASED SURFACE WATER RUNOFF).
311 N.E.2d 141 (Ill 1974).

Descriptors: *Surface runoff, *Riparian rights, *Judicial decisions, *Illinois, Runoff, Agricultural runoff, Drainage water, Water sources, Water supply, Water resources development, Water law, Surface waters, Base flow.
Identifiers: *Injunctive relief, *Common enemy rule.

Plaintiff sought injunctive relief against subdividers for converting their parcel of farmland into a residential subdivision resulting in an increase in the amount and rate of surface water runoff flowing onto plaintiff's land. Plaintiff also sought relief from the village for approving plans for the subdivision and accepting the dedication of streets when it knew or should have known that alterations of the course of nature would cause water to flow onto plaintiff's land. The defendants contended that the owner of the dominant estate has an unlimited right to alter the surfacewater drainage of his land as long as the water is not diverted from another watershed. The Supreme Court of Illinois found for the plaintiff and held that the increased flow of surface waters to the adjoining landowner was beyond a range consistent with the policy of reasonableness which led to the 'good husbandry' exception to the Drainage Act of 1885. (Proctor-Florida)
W76-00953

WATER RIGHTS,
Davis, Graham and Stubbs, Denver, Colo.
For primary bibliographic entry see Field 6E.
W76-00974

OMERNIK V. STATE OF WISCONSIN (APPEAL FROM CONVICTION FOR DIVERSION OF WATERS FROM LAKES AND STREAMS WITHOUT A PERMIT).
For primary bibliographic entry see Field 4A.
W76-00977

4C. Effects On Water Of Man's Non-Water Activities

EVALUATION OF EFFECTS OF LAND-USE CHANGES ON STREAMFLOW,
Geological Survey, Menlo Park, Calif.
D. R. Dawdy, and J. M. Bergmann.
In: Agricultural and Urban Considerations in Irrigation and Drainage: Selected Papers from the Irrigation and Drainage Division Specialty Conference, Fort Collins, Colorado, April 22-24, 1973. American Society of Civil Engineers, New York, p 619-626, 1974. 2 tab, 3 ref.

Descriptors: *Environmental effects, *Land development, *Streamflow, *Hydrologic models, *Storms, *Land use, Planning, Forecasting, Watershed management, Flood frequency, Flood data, Hydrologic data, Evaluation, Urbanization, Agriculture.

Deterministic structure-imitating hydrologic models can be an invaluable tool for predicting the changes in streamflow that will result from changes in land use. The relative magnitude of the change in streamflow resulting from a given change in land use will vary inversely with storm severity. The user of the hydrologic model should be aware of its limitations--a degree of error is inherent in every model and that error is usually compounded by uncertainties in the prediction of change in land use. (Woodard-USGS)
W76-00657

MODEL DEVELOPMENT AND SYSTEMS ANALYSIS OF THE YAKIMA RIVER BASIN -- FOREST HYDROLOGY MODEL,
Washington Univ., Seattle. Coll. of Forest Resources.
For primary bibliographic entry see Field 4D.
W76-00672

CONTRIBUTIONS OF URBAN ROADWAY USAGE TO WATER POLLUTION,
Biospherics Inc., Rockville, Md.
For primary bibliographic entry see Field 5B.
W76-00696

THE 1973 FLOOD AND MAN'S CONSTRICTION OF THE MISSISSIPPI RIVER,
Saint Louis Univ., Mo. Dept. of Earth and Atmospheric Sciences.
For primary bibliographic entry see Field 4A.
W76-00901

SYSTEM FOR EXPLOITATION OF THE 'COMMON HERITAGE OF MANKIND' AT THE CARACAS CONFERENCE,
Ministry of Foreign Affairs, Nairobi (Kenya). Legal Div.
For primary bibliographic entry see Field 6A.
W76-00933

BIG CYPRESS NATIONAL PRESERVE (PART 2-APPENDIX).
Hearings on S. 334, S. 783, S. 920, H. R. 10088-Subcomm. on Parks and Recreation--Comm. on Interior and Insular Affairs, U. S. Senate, 93rd Cong, 2nd Sess, March 21 and 22, 1974. 828 p, 116 fig, 6 map, 34 tab.

Descriptors: *Environmental effects, *Watershed management, *Wildlife management, *Florida, *Estuaries, Evaluation, Water resources, Water conservation, Governments, Legislation, Project planning, Watershed(Basins), Control, Habitat improvement, Wildlife conservation, Water control, Water supply, Hydrology, Environmental control.
Identifiers: *Environmental Impact Statements, *Big Cypress, *Everglades.

The Proposed Big Cypress National Fresh Water Reserve involves the acquisition over a 10-year period of 547,000 acres of lands in southwest Florida. Preservation of the watershed, its ecosystem and water supplies of nearby cities is the aim of the proposal. The area is mainly aquatic and supports a diversity of rare plant and animal forms which are endangered by the draining, mining, and other development by the surrounding communities. Support for preservation of the area began when the City of Miami began construction of a jetport in the area. In addition to preserving the water supply, acquisition of the Big Cypress watershed will restore the ecosystem and enhance the chance of survival of the 21 rare and endangered species living there. There are no expected adverse environmental effects of the proposal. If no action is taken, drainage and development projects will destroy the watershed. The other alternative is to use methods other than acquisition to preserve the area. Zoning measures appear inadequate because of the time required to approve and implement regulations by several levels of government. Creation of an environmental trust or public corporation for control of the area involves similar problems of coordination. Federal compensable land use regulations have never been adopted and would require federal legislation. The short-term effect of the proposal prevents further exploration of the area's resources; the long-term effect insures preservation of the watershed. The only irretrievable commitment of land is that designated for recreational use. Supplemental studies include an earlier Environmental Impact Statement by the Department of the Interior, and a hydrologic survey by the U. S. Geological Survey. (Jenkins-Florida)
W76-00970

CITY OF DAYTONA BEACH V. TONA-RAMA, INC. (ACTION FOR INJUNCTION TO PREVENT ERECTION OF PUBLIC OBSERVATION TOWER ON BEACH).
294 So. 2d 73 (Fla 1974).

Descriptors: *Easements, *Public rights, *Legal aspects, *Public acess, Riparian rights, Recreation, Water law, Judicial decisions, Florida, Atlantic Ocean, Scenic easements, Prescriptive rights, Right-of-way, Water resources development.
Identifiers: *Declaratory judgment, *Injunctive relief.

Action was brought by a municipality for a declaratory judgment and injunctive relief to prevent the erection of defendant's public observation tower on the beach. Defendant, a Florida corporation, owned waterfront property in the municipality and operated an ocean pier as a tourist attraction and recreation center. Plaintiff city

operated an observation tower near the site of defendant's pier and protested the construction of defendant's tower. Plaintiff alleged that by continuous use of the property for more than 20 years, the public had acquired an exclusive prescriptive right to use the land of the defendant. The Supreme Court of Florida held that even if the public had acquired an easement by prescription to unused areas of the defendant's ocean front parcel, the owner could make any use of the land consistent with, or not calculated to interfere with, the exercise of the public easement. (Proctor-Florida)
W76-00978

HUMAN ECOLOGY. PROBLEMS AND SOLUTIONS,
For primary bibliographic entry see Field 5C.
W76-00987

4D. Watershed Protection

EROSION IN THE URBAN ENVIRONMENT,
Johns Hopkins Univ., Baltimore, Md.
For primary bibliographic entry see Field 2J.
W76-00546

HYDROGRAPH RESPONSES TO WATERSHED MODEL SIZE AND SIMILITUDE RELATIONS,
State Univ. of New York at Syracuse. Coll. of Environmental Science and Forestry.
For primary bibliographic entry see Field 2A.
W76-00549

ENVIRONMENTAL ASPECTS--SACRAMENTO BANK PROTECTION,
Army Engineer District, Sacramento, Calif. Water Resources Planning Branch.
C. S. Mifkovic, and M. S. Petersen.
Journal of the Hydraulics Division, Proceedings of ASCE, Vol 101, No HY5, p 543-555, May, 1975. 7 fig, 5 ref.

Descriptors: Bank protection, *Flood control, *Rivers, *Erosion control, *Watershed management, Wildlife conservation, Levees, Construction, Recreation facilities, *California.
Identifiers: *Sacramento Valley(Calif).

While flood control in the Sacramento River Valley has been practiced for several years, little concern was given to riparian vegetation and wildlife along the river banks. For this reason, many reaches of the Sacramento River where bank protection work was performed have now eroded, depleting berm areas and attacking the levees. This paper examines alternative design and construction practices that are under study by the Sacramento District, Corps of Engineers, to minimize adverse environmental effects. Some studies are being implemented on a test basis, such as the Wild and Scenic Rivers Study, which is evaluating environmental resources and inter- relationships, physical characteristics of the river, water quality and use, recreation potential, land use, and social and cultural development. Possible modifications to preserve the environment which are being considered are: selective clearing and retention of vegetation with replacement at construction sites; restoration of berm areas; steeping the protected slope to preserve existing berm areas; requiring construction to be from the waterside with floating equipment; reducing the top of rock revetment to a high sustained flow level; and including recreation facilities at selected construction sites. (Kramer-FIRL)
W76-00621

MODEL DEVELOPMENT AND SYSTEMS ANALYSIS OF THE YAKIMA RIVER BASIN -- FOREST HYDROLOGY MODEL,
Washington Univ., Seattle. Coll. of Forest Resources.
J. D. Fox, and D. D. Wooldridge.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-246 195, $4.75 in paper copy, $2.25 in microfiche. State of Washington Water Research Center, Pullman, Report No 17E, November 1974. 75 p, 17 fig, 13 tab, 20 ref, 2 append. Partial completion report. OWRT B-036-WASH(8), B-043-WASH(9), and B-050-WASH(7). 14-31-0001-3348, -3663, and -3944.

Descriptors: *Computer models, Forests, Hydrology, *Runoff, Water balance, Watersheds(Basins), *Systems analysis, *Washington, Model studies, Computer programs, Clear-cutting, Seasonal, *Watershed management.
Identifiers: *Yakima River basin(Wash).

The basic concepts of watershed modeling are explored and a working model is developed for the forested zone areas in the Yakima River Basin of Washington. The model follows the general approach developed by Fordam at the Desert Research Institute, Reno, Nevada. Precipitation and temperature information are traslated into estimates of snowpack, snow melt, groundwater storage and, finally overland and groundwater flows. A FORTRAN program, calibrated for Yakima Basin conditions is used to estimate changes in total runoff and seasonal patterns. A particular application is made to changes in runoff following clearcut timber harvesting over various proportions of the watershed surface. (McKenzie-Washington State)
W76-00672

RELATIONSHIP OF DURATION OF FLOWS AND SELECTED WATERSHED PARAMETERS TO THE STANDING CROP ESTIMATES OF TROUT POPULATIONS,
Wyoming Univ., Laramie. Water Resources Research Inst.
R. A. Burton, and T. A. Wesche.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-246 197, $4.75 in paper copy, $2.25 in microfiche. Water Resources Series No 52, Dec 1974. 86 p, 14 fig, 13 tab, 22 ref, 2 append. Partial completion report. OWRT B-023-WYO(1). 14-31-0001-4143.

Descriptors: *Streamflow, *Flow duration, *Fish populations, *Trout, Standing crops, Average flow, *Watershed management, Fish reproduction, *Wyoming, Average flow.
Identifiers: Trout productivity, Watershed parameters, Minimum streamflow, Average daily flow.

The objectives were twofold: to aid in determining suitable streamflow recommendations for trout through the use of flow duration values, and to develop an index of potential trout productivity, utilizing watershed parameters that were found to be significantly related to standing crop estimates. The 25 percent recommended average daily flow level was equaled or exceeded an average of 55 percent of the time during the summer months in streams with good trout populations, as compared to an average of 15.8 percent of the time in streams with poor populations. Seven watershed parameters were significantly related to standing crop estimates in small Wyoming streams. Four of them--drainage area, total stream length, mean basin elevation, and forested area--were utilized in developing an index equation for the potential trout productivity. Calculated results of the index show a general relationship between geomorphic characteristics and standing crop estimates.
W76-00674

APPLICATION OF MICROWAVE WATER SENSING TECHNIQUES TO WATERSHEDS,
Montana State Univ., Bozeman. Dept. of Electrical Engineering.
For primary bibliographic entry see Field 7B.
W76-00675

REHABILITATION OF LAND DISTURBED BY SURFACE MINING COAL IN ARIZONA,
Arizona Univ. Tucson. Dept. of Watershed Management.
For primary bibliographic entry see Field 5G.
W76-00709

THE POTOMAC, 1974 ANNUAL REPORT.
Interstate Commission on the Potomac River Basin, Bethesda, Md.
Annual Report, 1974. 26 p, 4 illus, 18 photo, 1 chart.

Descriptors: *Watersheds(Basins), *Potomac River, *Interstate commissions, *Pollution abatement, *History, Maryland, Virginia, District of Columbia, Acid mine water, Administrative agencies, Algal control, Sedimentation, West Virginia, Dams, Reservoirs, Swimming, Water purification, Watershed management, Federal Water Pollution Control Act, Industrial wastes, Flood control, Water sampling.
Identifiers: Shenandoah River, Non-point pollution, Cancer producing agents, Drinking water, Interstate Commission on the Potomac River Basin(ICPRB).

Improvements are depicted that have been made in the Potomac River watershed. Beginning with a Presidential declaration in 1965 that the Potomac would be safe for swimming within ten years, a sustained multi-state effort has reclaimed waters from mine acid contamination, insufficient sewage treatment, and various types of non-point source pollution such as land runoff that add sediment thereby clogging areas downstream. Since the Potomac basin supplies drinking water for millions of people in the Maryland--Virginia--District of Columbia area, the discovery of possible cancer producing agents in Potomac waters has stimulated great concern. However, control projects such as dams and reservoirs are not always popular since the area is heavily populated and of great historical importance. The main responsiblity for reclaiming the river and for reconciling the diverse needs of its users rests with the Interstate Commission on the Potomac River Basin (ICPRB), established in 1940. Under the 1972 Amendments to the Federal Water Pollution Control Act, the Commission's activities have greatly expanded to include all areas of river supervision. (Parrish-Florida)
W76-00935

MAJOR FLOODS, POOR LAND USE DELAY RETURN OF SEDIMENTATION TO NORMAL RATES,
Forest Service (USDA), Berkely, Calif. Pacific Southwest Forest and Range Experiment Station.
H. W. Anderson.
Research Note PSW-268, 1972. 4 p, 1 fig, 1 tab, 9 ref.

Descriptors: *Watershed management, *Forest management, *Lumbering, Grasslands, *Erosion, Suspended sediment, *Water quality, *Floods, Geomorphology, Sediment transport, Forecasting, *Land use.
Identifiers: Logging effects, Vegetation type conversion, Sediment delivery processes.

When suspended sediment concentrations are suddenly accelerated by factors of 5 or more the hydrogist making predictions of long-term sedimentation is in trouble. Recovery from flood accelerated sedimentation influences both estimates of average long-term sedimentation and short-term monitoring of sedimentation changes. But, these accelerations and their decline are at least in part predicable. Analyses of the 'years to return to normality' were made for 10 northern California watersheds following the accelerations in average sediment concentration associated with the December 1964 flood. Returns to normalcy took from zero to 9 years, with the rate of decline being related both to the amount of initial acceleration

and watershed differences. Explained variance in years to recovery increased with the coefficient of path lengths in the watershed, with the area of poor logging, with the area of steep grassland, and with the percent of area in the sedimentary rock types Cenozoic or younger. Thus, part of the delayed recovery was attributed to sediment in transit released by the major flood and part to recovery of sediment source areas from the impact of the floods. Sediment determinations during flood versus non-flood periods may alter estimates by a factor of 2 or more. (Forest Service)
W76-00989

5. WATER QUALITY MANAGEMENT AND PROTECTION

5A. Identification Of Pollutants

THE EFFECTS OF STREAM CHANNELIZATION OF THE DISTRIBUTION OF NITRIENTS AND METALS,
East Carolina Univ., Greenville, N.C. Dept. of Biology.
For primary bibliographic entry see Field 5B.
W76-00501

ASSESSMENT AND DEVELOPMENT PLAN FOR MONITORING OF ORGANICS IN STORM FLOWS,
Raytheon Co., Portsmouth, R.I.
A. Molvar, and A. Tulumello.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-238 810, $4.75 in paper copy, $2.25 in microfiche. Environmental Protection Agency, Report EPA-670/2-74-087, December, 1974. 88 p, 20 fig, 10 tab, 20 ref.

Descriptors: *Storm runoff, *Overflows, *Monitoring, Organic compounds, Infrared radiation, Sewage disposal, Analytical techniques, Storm water, Rivers, Automation, Organic wastes, Pollutant identification.
Identifiers: *Total Organic Carbon(TOC).

A method for assessing the organic content of incoming combined sewage during storm water periods is necessary to permit programming overflows. The ultimate objective of this study was to design a device for the automatic and rapid on-site monitoring loading of strom and combined sewer flows. Evaluation of the instrumentation necessary for a reliable Total Organic Carbon (TOC) measurement indicated that the best system would be one based on total oxidation of sewage and infrared detection of the carbon dioxide. Although no commercially available automatic monitoring system is suitable for sorm water service, it is believed that most of the components to build such a system are available. Tests are being conducted to establish sample processing, modifications on the engineering model, and accumulation of the continuous monitoring data on TOC content of storm and combined sewers. (Kramer-FIRL)
W76-00507

GROUNDWATER POLLUTION FROM SUBSURFACE EXCAVATIONS, PART XI, TANK AND PIPELINE LEAKAGE.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5B.
W76-00528

SOME OBSERVATIONS CONCERNING PREPARATION AND STORAGE OF STREAM SAMPLES FOR DISSOLVED INORGANIC PHOSPHATE ANALYSIS,
Cornell Univ., Ithaca, N.Y. Dept. of Agronomy.
A. H. Johnson, D. R. Bouldin, and G. W. Hergert.
Water Resources Research, Vol 11, No 4, p 559-562, August 1975. 3 fig, 4 tab, 9 ref.

Descriptors: *Pollutant identification, *Phosphates, *Phosphorus compounds, Surface waters, Storage, Storage requirements, Analytical techniques, *Sampling, Inorganic compounds, Phosphorus, Dissolved solids, Streams, Rivers, Water storage, Preservation, Spectrophotometry, Chemistry, Evaluation, Instrumentation, Laboratory tests, Freezing, Refrigeration, Analysis, *New York.
Identifiers: *Dissolved inorganic phosphate, Sample storage, Chemical preservatives, *Fall Creek(NY), Stream samples, Isobutanol extraction procedure, Autoanalyzer.

The influence of storage conditions and duration of storage was studied by using about 100 stream samples from Fall Creek collected near Ithaca, New York. Freezing and refrigerated storage were found to be unsatisfactory, since changes in measured concentrations were usually observed after relatively short periods of time (24 hours). An isobutanol extraction procedure was described which minimizes storage problems and is useful for routine analysis of water samples for dissolved inorganic phosphate. (Henley-ISWS)
W76-00538

EMPIRICAL METHODS OF USING SOILS AS RADIATION DOSIMETERS,
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
H. Nishita, and M. Hamilton.
Soil Science, Vol 120, No 2, p 96-106, August 1975. 7 fig, 5 tab, 12 ref. ERDA AT(04-1) GEN-12.

Descriptors: *Pollutantidentification, *Radiation, *Soil tests, *Analytical techniques, *Irradiation, *Instrumentation, Soil analysis, Saline soils, Soil chemical properties, Calcareous soils, Radioactivity, Chemical analysis, Chemical properties, Nuclear explosions, Radioecology, Safety, Environmental effects, Soil chemistry, Ecosystems, Cobalt.
Identifiers: *Radiation dosimeters, *Thermoluminescence characteristics, *Dosimeters, Ionizing radiation, Radiation exposure, Glow curve area, Exposure level, Cobalt 60.

Two empirical methods oflusing soils as ionizing radiation dosimeters were presented. These methods were derived through the use of the thermoluminescence characteristics of soils. Method A was designed for irradiated soils for which pre-irradiation collection of the soils was available. This method is workable for maximum radiation exposure levels up to about 480,000 roentgens. Method B was designed for irradiated soils for which pre-irradiation collection of them was not available. This method is workable for maximum radiation exposure levels up to about 5,000 roentgens. Some of the reasons for the discrepancy in the sensitivity between the two methods were discussed. Various factors that influence the measurement of soil thermoluminescence were noted. (Henley-ISWS)
W76-00542

A DUAL-INTERVAL, LIGHT-ACTIVATED SIGNAL GENERATOR--ITS APPLICATION TO SEDIMENT SAMPLING,
Agricultural Research Service, Chickasha, Okla.
For primary bibliographic entry see Field 2J.
W76-00543

PREPARING AN INFILTRATION/INFLOW ANALYSIS,
Gilbert Associates, Inc., Reading, Pa.
For primary bibliographic entry see Field 5D.
W76-00564

METHOD AND APPARATUS FOR MONITORING AND CONTROLLING HALOGEN LEVELS IN A WATER TREATMENT SYSTEM,
For primary bibliographic entry see Field 5F.
W76-00576

ALKALINITY CALCULATIONS IN WATER,
Kiriat-Yam 'G', Haifa (Israel).
For primary bibliographic entry see Field 2K.
W76-00599

GAS CHROMATOGRAPHIC (ECD) DETERIMINATION OF COPROSTANOL AND CHOLESTEROL AS INDICATORS OF FECAL POLLUTION IN WATER, (IN JAPANESE),
Ehime Univ., Matsuyama (Japan). Dept. of Chemistry.
H. Matsushima, T. Wakimoto, and R. Tatsukawa.
Bunseki Kagaku, (Japan Analyst), Vol 24, No 6, p 342-345, June, 1975. 3 fig, 1 tab, 4 ref.

Descriptors: *Pollutant identification, *Water pollution sources, *Gas chromatography, *Monitoring, Environmental effects, Waste disposal, *Bioindicators.
Identifiers: Coprostanol, Cholesterol, Human wastes, Fecal pollution, Electron capture detectors.

A gas chromatographic method for the determination of coprastanol and cholesteral as indicators of fecal pollution in water is described. Coprostanol (5 beta-cholestan-3 beta-ol) is one of the major fecal sterols excreted by man and livestock and is a good indicator of fecal pollution. Thus, the method is applicable to the determination of trace amounts of coprostanol in seawater in order to monitor the disposal of human and animal wastes in the marine environment. Coprostanol and cholesterol extracted with n-hexane were silylated with bromomethyldimethylchlorosilane (BMDS); reaction products were determined by a gas chromatograph equipped with an electron capture detector. The detection limits were 10 ng/liter for coprostanol and 20 ng/liter for cholesterol. These limits were 10,000 times less than those of the conventional procedure. (Kramer-FIRL)
W76-00602

NEW ORLEANS DRINKING WATER SOURCES TESTED BY GAS CHROMATOGRAPHY MASS SPECTROMETRY, OCCURRENCE AND ORIGIN OF AROMATICS AND HALOGENATED ALIPHATIC HYDROCARBONS,
New Orleans Univ., La. Dept. of Biological Sciences.
B. J. Dowty, D. R. Carlisle, and J. L. Laseter.
Environmental Science and Technology, Vol 9, No 8, p 762-765, August, 1975. 3 fig, 3 tab, 9 ref.

Descriptors: *Water analysis, *Organic compounds, *Potable water, Water sources, Analytical techniques, Pollutant identification, Water pollution sources, Chlorination, Gas chromatography, Mass spectrophotometry, *Louisiana, *Aromatic compounds.
Identifiers: *Chlorinated hydrocarbons, *New Orleans(La), *Aliphatic compounds.

Low molecular weight volatile organic compounds were thermally extracted from water samples before, during, and after processing by a New Orleans, La., municipal water treatment plant. Bottled artesian water and water from a charcoal filtering-deionizing unit were also examined. The volatile compounds were trapped on a solid polyphenyl ether adsorbent and resolved by high resolution gas chromatography. A gas chromatograph-mass spectrometer-computer combination was used to identify major aromatic and halogenated aliphatic components. About 70 organic constituents can be detected in any single analysis of liter size. Most of these organics are either aromatic or halogenated aliphatic and aromatic. The major constituents of finished water are benzene, carbon tetrachloride, dichloroethane, bromodichloromethane, and chloroform. The concentrations of many halogenated and aromatic organics such as trichloroethylene, 2- or 1-naphthyl-dichloromethane, and xylene are unchanged by passing through the treatment plant. The concen-

trations of dichloroethylene, chloroform, benzene, carbon tetrachloride, dichloroethane, bromodichloromethane, toluene, and dibromochloromethane are enhanced greatly in the water treatment process. This increase in concentrations indicates that they are formed by chlorination of precursor organic molecules. The organics in the bottled artesian water were the same as those in the finished water. Variations in organics present and their relative concentrations varied from bottle to bottle. The preliminary data suggests that further studies are needed to determine the value of charcoal filtering for potable water production. (Orr-FIRL)
W76-00603

WATER MONITORING STATIONS,
Honeywell, Inc., Minneapolis, Minn.
J. O. Johnson, Jr.
Water and Sewage Works, Reference Number, p R178, R180-182, R184-R185, April 30, 1975. 11 fig, 10 ref.

Descriptors: *Pollutant identification, *Waste water treatment, *Monitoring, *Measurement, Instrumentation, Equipment, Water quality control, Pumps, Pipelines, Data transmission.

Equipment and systems for monitoring water quality parameters both in plant and streamside are discussed. In-situ system measurement makes use of a submersible cluster of sensor which measure the parameters at the point of submersion. This is a simple system to use when environmental conditions permit. The most common method of obtaining water samples is to pump from the source to some location where the sensors are housed. This system is characterized by the separately mounted pump with piping to the measuring equipment which is located in a separate shelter or space within the plant. The factors which aid in a determining the location of the sampling site and the mounting and anchoring facilities include the type of water, annual water level data, and flood level and flood history. The kind of debris that may be in the water course should also be considered when choosing the type of equipment and site. The preferred pump is the positive displacement type. The most common method of mounting is to support the pump by a pipe from a pier, truss, bridge, or bulkhead. A pump can be mounted in a still well for protection from the weather. A slanted stillwell is becoming increasingly popular. Debris screens will help to keep the debris out of the system but many of the available screens are difficult to position and too small. The plumbing can be critical because of the debris. The piping should be laid out to minimize sharp bends, changes in cross section, and areas for sediment to collect. The pressure regulation that most systems require in order to function properly can be accomplished with a bypass or discharge valve. (Orr-FIRL)
W76-00605

CHEMICAL COMPOSITION OF ORGANIC COMPOUNDS PRESENT IN WATER OF THE TAMAGAWA RIVER, (IN JAPANESE),
N. Ogura, Y. Ambe, and K. Ogura.
Rikusui Gaku Zasshi, (Japanese Journal of Limnology), Vol 36, No 1, p 23-30, January, 1975. 2 fig, 7 tab, 17 ref.

Descriptors: *Organic matter, *Rivers, *Pollutant identification, Filtration, Detergents, Organic compounds, Water pollution sources.
Identifiers: Dissolved organic matter, *Japan(Tamagawa River).

An investigation was conducted to determine the chemical composition of dissolved organic matter (DOM) in the water of the Tamagawa River, near Tokyo, in November 1972 and May and November 1973. Samples were filtered through glass fiber filters for analysis. The percentage of each chemical component to the total DOM was as follows: carbohydrates, 16-18%; protein, 29-36% (amino acids, 25%); lipids, 3%; urea, 1%; and ABS, 9-16%. The percentage of protein (nitrogen containing compounds) was larger than that of lipids (ether extractable compounds) was smaller than had been observed in seawater samples. ABS derived from detergents was also present in large amounts in the Tamagawa River samples. In addition, trace organic compounds including fatty acids, sterols, polyaromatic hydrocarbons, BHC and phthalate esters were found in these samples. (Kramer-FIRL)
W76-00606

DETERMINATION OF ORGANIC CARBON IN WATER USING A PCO2 ELECTRODE, (IN JAPANESE),
Asahi Glass Co., Yokohama (Japan). Research Lab.
M. Noshiro, and T. Yarita.
Bunseki Kagaku, (Japan Analyst), Vol 24, No 6, p 390-391, June, 1975. 1 fig, 1 tab.

Descriptors: *Organic matter, *Pollutant identification, *Electrodes, Analytical techniques, Measurement.
Identifiers: *Total organic carbon, Sensors, PCO2 measurement.

The concentration of total organic carbon in water may be measured with a PCO2 electrode as a sensor. The feasibility of this method was studied. Because nitrogen in air is coverted into NOx which interferes with the PCO2 measurement, oxygen carrier gas (300 ml/min) rather than air, was used. A sample combustion chamber was maintained at 800 C and an oxidation chamber was operated at 600 C. Carbonaceous materials were oxidized to carbon dioxide with a Pt-Rh catalyst on alumina; water vapor was removed at room temperature by a cooling trap; carbon dioxide was absorbed in 2 ml of 0.5 M NaOH solution. The solution was acidified with one ml of 2 M HCl and introduced into a cell, where the potential of a PCO2 electrode could be measured. The content of total organic carbon in the sample was calcualted from a calibration curve obtained with the standards solution in the same manner. Analysis time was about eight minutes, precision about plus or minus 20%. (Kramer-FIRL)
W76-00607

DEVELOPMENT OF A GROSS POLLUTION DETECTOR: LABORATORY STUDIES,
Severn-Trent Water Authority, (England).
G. J. Holland, and A. Green.
Water Treatment and Examination, Vol 24, Part 2, p 81-99, 1975. 6 fig, 6 tab, 4 ref, 2 append.

Descriptors: *Monitoring, *Water pollution, *Nitrification, *Ammonia, *Pollutant identification, Rivers, Toxins, Water pollution sources, Water quaility, Analytical techniques, Electrodes.
Identifiers: Ammonia-ion electrode.

The development and testing of a gross pollution detector (GPD) is discussed. The monitoring system was based on a continuously operating percolating filter in which nitrifying organisms were selectively cultured. A specific-ion electrode was used to indicate changes in the rate of nitrification of ammonia. Numerous compounds have been found which could inhibit nitrification. The media was carefully graded 20 mm granite chippings, supported in a PVC tube. The term 'Toxicity threshold concentration' was devised from the relative toxicities of the substances tested and means 'that concentration of pollutant which will bring about a 50% inhibition of nitrification'. The toxicity threshold concentration is determined by plotting the maximum percentage inhibition against concentration for each of the concentrations used and determining the concentration that would result in 50% inhibition. The investigation showed the basic soundness of the concept of using the automatic detection of the inhibition of nitrification as a warning of the presence of pollution. More evaluations of this monitoring system should be performed. (See also W76-00610) (Orr-FIRL)
W76-00609

DEVELOPMENT OF A GROSS POLLUTION DETECTOR: FIELD TRIALS,
Severn-Trent Water Authority, (England).
K. C. G. Stroud, and D. B. Jones.
Water Treatment and Examination, Vol 24, Part 2, p 100-119, 1975. 7 fig, 1 ref, 1 append.

Descriptors: Rivers, *Pollutant identification, On-site tests, Potable water, Effluents, Ammonia, Waste water treatment, *Inhibition, *Analytical techniques.
Identifiers: Gross pollution detectors.

A detector for gross pollution in rivers was developed by the Severn-Trent Water Authority, Great Britain. The operating principle of the detector is based on the inhibition of pollutants by bacteriological oxidation of ammonia in a nitrifying column. Field trials on a series of rivers were conducted in order: to identify and try to overcome problems associated with using the gross pollution detector on actual river sites; to determine if the detector could be developed into a reliable plant which could be installed at any station; and to learn how well the detector operated on rivers carrying a range of pollution loads. Field trials were conducted on the following rivers: Severn, a relatively unpolluted river but one often having high turbidity and used for water supply; Bourne, a smaller river used for potable water, carrying effluents from several sewage works, having heavy silt during flood periods; Blythe, having a high proportion of sewage effluents for a potable water source; Cole, polluted and not a water supply source; and Tame, badly polluted. After two years of trials and improvements, the reliability of the nitrifying column and the specific ion electrode for ammonia were demonstrated. Once the nitrifying column had achieved its optimum efficiency it ran for several months continuously and the ammonia concentration in the effluents was not affected by other river characteristics. (See also W76-00609) (Kramer-FIRL)
W76-00610

USE OF A MOBILE LABORATORY FOR POLLUTION DETECTION,
Bristol Waterworks (England).
E. R. Gardiner, and L. R. Bays.
Water Treatment and Examination, Vol 24, Part 2, p 120-131, 1975. 1 ref, 1 append.

Descriptors: *On-site laboratories, *Pollutant identification, Rivers, Phenols, Heavy metals, *Analytical techniques, Laboratory equipment, Water pollution control.
Identifiers: *Mobile laboratory, Gross pollution detector, Severn River Authority.

The function of a vehicle for pollution detection in rivers is discussed. This mobile laboratory has been designed for immediate action in the case of pollution and not as a replacement for existing fully-equipped laboratory facilities. Since the development of a Gross Pollution Detector by the Severn River Authority, an increased number of warnings should be given, and it is hoped that the mobile laboratory will facilitate faster identification of point source pollutants. The mobile laboratory should be able to arrive at a site, take a sample for immediate analysis and one for a retention and return to the main laboratory, place two guppies in a portion of the sample for observation, and run several analyses such as odor, visible pollution, pH, temperature, dissolved oxygen, organophosphorus, organochlorines, and heavy metals. In two cases cited, the mobile laboratory was able to detect and trace the source of pollution discharges within two to three hours of dispatch. The specific laboratory methods employed by the

mobile unit to detect phenols, arsenic, ammonia, heavy metals, lead, copper, zince, hexavalent chromium, cadmium, cyanide, thiocyanate, organophosphorus compounds, organochlorine compounds, and herbicides are outlined. (Kramer-FIRL)
W76-00611

X-RAY FLUORESCENCE ANALYSIS OF TRACE METALS IN WATER BY MEANS OF CONDENSATION DEPENDING ON ADSORPTION BY ACTIVE CARBON (KASSEI TAN KYUCHAKUHO NI YORU SUICHU BIRYO KINZOKU GENSO NO KEIKO X-SEN BUNSEKI),
M. Yamaguchi, and H. Shiio.
Nagoya-shi Kogyo Kenyusho Kenkyo Hokoku, (Research Report of Nagoya Municipal Industrial Research Institute), No 53, p 5-8, 1975. 10 fig, 1 tab, 5 ref.

Descriptors: *Pollutant identification, *Trace elements, *Metals, *Copper, Nickel, Chromium, Analytical techniques, Spectroscopy, X-ray spectroscopy, Chelation, *X-ray fluorescence.
Identifiers: Japan, EDTA, Trace metals.

The trace metals Cu, Ni, and Cr in water were analyzed by chelation with EDTA, followed by adsorption on activated carbon, placement of the carbons on coated filter paper with PVA, and x-ray spectrography. The x-ray intensity of adsorbed activated carbon with the chelated metals was two times that of non-chelated metals. The sensitivities, when 0.2 g activated carbon were added to 100 ml analytical water, were 0.1 ppm for copper, 0.04 ppm for nickel, and 0.04 ppm for chromium. The three types of trace metals may be analyzed by x-ray techniques simultaneously, as one does not affect the accuracy of the measurement of the others. (Kramer-FIRL)
W76-00612

A CONTINUOUS GARGANTUAN TASK FOR SEVERN TRENT,
Severn Trent Water Authority (England).
D. Brewin, and J. Tapson.
Water, No 4, p 23-26, July, 1975. 3 ref.

Descriptors: *Water supply, *Administration, *Water treatment, *Waste water treatment, *Data collections, Publications, Water quality control, Water analysis, Water districts.
Identifiers: *Severn Trent Water Authority (UK).

As one of its first tasks the Severn Trent Water Authority commissioned 'Water Quality 1973', a document containing in one volume water quality data covering the whole water cycle. The preparation of this report is discussed. The report required data collection from a variety of sources and this variety led to many difficulties in unifying the data presentation. In addition there were also legal difficulties and many unforeseen problems. Prior to April 1, 1974, the management of water services was the responsibility of 26 statutory water undertakings, 210 local authorities, two drainage authorities and two river authorities within the Severn Trent area. Most of the former authorities had water quality data already processed and on file. It was decided to use this data, obtained over a period immediately prior to reorganization, in 'Water Quality 1973'. Gathering of the data required for the production of 'Water Quality 1973' highlighted the inadequacies of much of the data. 'Water Quality 1973' is the baseline report of water quality in the Severn Trent Water Authority. It consists largely of tables of figure; the figures are also illustrated by pie diagrams and colored maps. (Orr-FIRL)
W76-00640

STUDIES ON FLOC-FORMING SUBSTANCES IN ACTIVATED SLUDGE. II. FLOC-FORMING ACTION BY THE VISCOUS SUBSTANCE EXTRACTED FROM ACTIVATED SLUDGE BY ALKALINE SOLUTION. (IN JAPANESE),
Gifu College of Pharmacy, (Japan).
For primary bibliographic entry see Field 5D.
W76-00645

ORGANIC CONTAMINANTS IN WATER SUPPLIES.
American Water Works Association, New York. Committee on Organic Contaminants.
Journal of the American Water Works Association, Vol 67, No 8, p 418-424, August, 1975. 5 fig, 3 tab, 12 ref.

Descriptors: *Water treatment, *Organic compounds, *Monitoring, *Pollutant identification, *Analytical techniques, Water analysis, Chemical analysis, Potable water, Water quality control, Gas chromatography, Water supply.
Identifiers: Carbon adsorption method(CAM), High-flow CAM, Low-flow CAM, Organics-carbon adsorbable test, Carbon chloroform extract(CEE), Carbon alcohol extract(CAE).

The findings of the subcommittees of the AWWA Committee on Organic Contaminants in the areas of organic contaminants in water supplies and the status of detection methods are reported. Standard monitoring procedures for organic contaminants involve three variations of the carbon adsorption method (CAM): the high-flow CAM (CAM-hf); the low-flow CAM (CAM-lf); and, the organics-carbon adsorbable (O-CA) test. The following recommendations were offered by the committee. The organic contaminant content of the water should be monitored continuously before and after treatment. The O-CA technique seems to be a promising technique for this monitoring. The historical carbon chloroform extract (CCE) and carbon alcohol extract (CAE) data retrieved from STORET should be subjected to extensive study and statistical evaluation. The concentration and cleanup step in the analysis of trace organics needs to be thoroughly investigated. Available procedures for this step, such as carbon or macromolecular resin adsorption, freeze concentration, and solvent extraction, should be qualitatively and quantitatively evaluated, improved, and possible automated to facilitate wider application. Research should be performed to improve rapid gas chromatography techniques for water quality control. The interfaced gas chromatograph-mass spectrometer-computer system for organic analysis should be further developed. Its application in water treatment should be demonstrated. (Orr-FIRL)
W76-00647

GROUND-WATER BASIC DATA FOR GRANT AND SIOUX COUNTIES, NORTH DAKOTA,
Geological Survey, Bismarck, N. DAK.
For primary bibliographic entry see Field 7C.
W76-00653

GROUND-WATER QUALITY IN INDIAN WELLS VALLEY, CALIFORNIA,
Geological Survey, Menlo Park, Calif.
J. W. Warner.
Available from the National Technical Information Service Springfield Va. 22161. Water-Resources Investigations 8-75, June 1975. 59 p, 24 fig, 1 plate, 5 tab, 20 ref.

Descriptors: *Pollutant identification, *Water quality, *Groundwater resources, *California, *Deserts, *Chemical analysis, Sampling, Water wells, Aquifer characteristics, Water properties, Water utilization, Water supply, Groundwater movement, Environmental effects, Sewage lagoons, Infiltration, Water pollution,
Identifiers: *Indian Wells Valley(Calif), *Mojave Desert.

Indian Wells Valley is in a semiarid region of the Mojave Desert, Calif. The U. S. Naval Weapons Center at China Lake and the communities of Ridgecrest, Inyokern, and China Lake depend on an adequate source of groundwater. Indian Wells Valley is a virtually closed basin with limited available groundwater, and much of the groundwater is of poor quality. Most of the groundwater pumping occurs in the Inyokern, intermediate, and Ridgecrest areas. The quality of groundwater in these areas is considered excellent for public use. The quality of the groundwater deteriorates with depth in the central part of the valley from less than 300 mg per litre dissolved solids at a depth of 300 feet to about 1,000 mg per litre at a depth of 800 feet. As water levels in wells in the area of pumping depressions continue to decline, a greater proportion of the water pumped from these wells will come from the deeper part of the aquifer, causing a trend toward increase in concentrations of dissolved solids. (Woodard-USGS)
W76-00658

INVESTIGATION OF THE ORION RESEARCH CYANIDE MONITOR,
Environmental Protection Agency, Cincinnati, Ohio.
R. J. O'Herron.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/4-75-005, April 1975. 24 p, 5 fig, 6 tab, 9 ref. 1HA327; ROAP 01AAD, TASK 02C.

Descriptors: Activity coefficients, *Metals, Performance, Evaluation, *Monitoring, Electrodes, Instrumentation, Ions, *Pollutant identification.
Identifiers: *Cyanides, *Metals complexes, Free ions, Ionic interferences, Ionic strength, *Ion-selective electrode, Reagent additions, Specific ion electrodes.

The model 1206 Orion Research cyanide monitor was investigated using the Orion specifications and environmental considerations as a guide. Laboratory tests under controlled environmental conditions showed the electronic stability (drift) to be within 0.1% over the temperature range of 5C to 35C. Sensor stability, over the temperature range 5C to 35C was tested by applying free cyanide ion (standard solutions of 1 mg/l and 10 mg/l) as direct input to the monitors. The results of these tests showed that Orion's specified tolerance of plus or minus 10% of reading was met. Two out of three electrode sets tested for linearity were within Orion's tolerance of plus or minus 0.02 ppm below 0.25 ppm and plus or minus 10% of readings above 0.25 ppm. Dyanmic on-stream measurements were made from a metal plating process rinse stream in a field installation of the monitor, and these measurements were periodically compared with those of the standard method for total cyanide. This field installation revealed the comparisons were widely variable. Steady-state comparisons were made of field-collected samples with the standard method for determining total cyanide. These tests revealed that a 15% to 20% loss in cyanide concentration resulted from the required straining and filtering of the sample input to the monitor. (EPA)
W76-00677

SCIENTIFIC AND TECHNICAL ASSESSMENT REPORT ON PARTICULATE POLYCYCLIC ORGANIC MATTER.
Environmental Protection Agency, Research Triangle Park, N. C.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-241 799, $4.75 in paper copy, $2.25 in microfiche. Environmental Protection Agency, Report EPA-600/6-75-001, March 1975. 1AA001.

Descriptors: Organic matter, Reviews, Evaluation, Organic compounds, Pollutant identification, Air pollution effects.
Identifiers: Polycyclic organic compounds, Benzo(a) pyrene.

A review and evaluation is presented of the current knowledge of particulate polycyclic organic matter in the environment as related to possible deleterious effects on human health and welfare. Sources, distribution, measurement, and control technology are also considered. Results of an extensive literature search are presented. Experiments have shown a number of polycyclic organic compounds to be carcinogenic in animals. Although these same compounds have not been proven to be carcinogenic in humans, evidence strongly suggests that they may contribute to the 'urban factor.' In American males, the urban lung cancer death rate is about twice the rural rate, even after adjustment for differences in smoking habits. Evidence suggests significant differences between specific urban areas across the United States. The bulk of the available data is in terms of Benzo(a)pyrene; so this compound has been used as an index on particulate polycyclic organic matter. Average seasonal concentrations of BaP in the ambient atmosphere range from less than 1ng/m3 in nonurban areas to a maximum of 50 ng/m3 in rural areas. (EPA)
W76-00682

SEWERAGE SYSTEM MONITORING AND REMOTE CONTROL,
Detroit Metro Water Dept., Mich.
For primary bibliographic entry see Field 5D.
W76-00691

TCA IN IRRIGATION WATER AFTER BANK TREATMENTS FOR WEED CONTROL,
Agricultural Research Service, Prosser, Wash. Irrigated Agriculture Research and Extension Center.
For primary bibliographic entry see Field 5B.
W76-00706

NITROGEN-15 VARIATIONS IN FERTILIZER NITROGEN,
Kernforschungsanlage, Juelich (West Germany). Institut fuer Physikalische Chemie.
H. D. Freyer, and A. I. M. Aly.
Journal of Environmental Quality, Vol 3, No 4, p 405-405, Ocotober-December, 1974. 1 tab, 11 ref.

Descriptors: *Fertilizers, Nitrogen, *Ammonium compounds, Fertilization, Nitrate, *Pollutant identification.
Identifiers: Ammonia-nitrogen, Nitrogen-15.

Nitrogen-15 concentrations of some commonly used nitrogen fertilizers are measured. Ammonium-nitrogen has lower and nitrate-nitrogen has higher 15 (N) concentrations than atmospheric nitrogen. (Skogerboe-Colorado State)
W76-00722

A SURVEY OF THE BORON CONTENT OF CERTAIN WATERS OF THE GREATER LONDON AREA USING A NOVEL ANALYTICAL METHOD,
Anglian Water Authority, Huntingdon (England). Directorate of Scientific Services.
P. J. Matthews.
Water Research, Vol 8, No 12, p 1021-1028, December, 1974. 1 fig, 7 tab.

Descriptors: *Pollutant identification, Water analysis, *Boron, *Aquatic environment, *Sewage, *Sewage effluents, *Analytical techniques, Water quality, Water pollution.
Identifiers: *London area(England).

Natural levels of boron, (As boric acid), in the aquatic environment have been raised artificially in certain areas by sewage effluents. Boron is present in sewage effluent by virtue of the use of sodium perborate as a whitener is washing powders. A novel analytical method based on the solvent extraction of ferroin borodisalicylate was used in a survey of various types of sewage, sewage effluent and natural waters in the London area. The method was satisfactory under all conditions. The data obtained will be useful in water resource planning and indicated that the concentration of boron in a watercourse may be used, under certain conditions, to determine the degree of dilution of sewage effluent in the watercourse. (Skogerboe-Colorado State)
W76-00727

BIODEGRADATION OF AQUATIC POLLUTANTS,
Rhode Island Univ., Kingston. Dept. of Microbiology.
For primary bibliographic entry see Field 5B.
W76-00821

FURTHER STUDIES OF THE INTERACTION OF CHLORINE AND ORGANIC MOLECULES IN WATER,
Rhode Island Univ., Kingston. Dept. of Pharmacology and Toxicology.
Y. Shimizu.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-246 274, $3.25 in paper copy, $2.25 in microfiche. Completion Report, (1975). 12 p, 6 fig, 1 tab, 10 ref. OWRT B-057-RI(1). 14-31-0001-4124.

Descriptors: *Chlorination, Amino acids, Lignins, Chlorine, Organic acids, *Pollutant identification.
Identifiers: *Nucleic acids, Vanillin, Caffeine, RNA, DNA.

The existence of nucleic acids and their derivatives in water has been reported. Unexpectedly large amounts of chlorine are incorporated into the nucleic acids, both RNA and DNA. Chlorine attacks the pyrimidine derivatives of nucleic acid first, then attacks the purine derivatives of nucleic acid destructively to form small fragments. 5-Chlorocytosine and 5-chlorouracil were isolated from the chlorinated RNA. 5-Chlorocytosine but no chlorinated thymine derivatives were isolated from the chlorinated DNA. Lignins were chlorinated with chlorine in water to 17% chlorine content. Vanillin is susceptible to chlorination but caffeine is not.
W76-00822

DISSOLVED OXYGEN DEPLETION IN STATIC BIOASSAY SYSTEMS,
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. fo Fisheries and Wildlife Sciences.
C. B. Schreck, and P. Brouha.
Bulletin of Environmental contamination and Toxicology, Vol 14, No 2, p 149-152, August 1975, 3 tab, 20 ref.

Descriptors: *Biomass, *Bioassay, *Dissolved oxygen, *Decomposing organic matter, Fish, Water quality, Laboratory tests, Water pollution effects, *Toxicity.
Identifiers: *Bluegill, *Lepomis macrochirus, *Dead fish.

Dead individuals in an aquatic bioassay were found to influence the toxicity of test substances to the remaining living fish within the system. Test results indicated an inverse relationship between dead fish (Bluegill, Lepomis macrochirus) biomass and the dissolved oxygen in the system. The greater the amount of decomposing tissue the more rapid was the decline in oxygen from saturated levels. (Klein)
W76-00869

MERCURY IN FISH IN THE DERWENT ESTUARY, TASMANIA, AND ITS RELATION TO THE POSITION OF THE FISH IN THE FOOD CHAIN,
Commonwealth Scientific and Industrial Research Organization, Hobart Australia. Tasmanian regional.
D. A. Ratkowsky, T. G. Dix, and K. C. Wilson.
Australian Journal of Marine and Freshwater Research, Vol 26, No 2, p 223-232, July 1975. 1 fig, 5 tab, 25 ref.

Descriptors: *Heavy metals, Fish, *Mercury, *Food chains, Sampling, Analytical techniques, Speciation, Estuaries, *Australia, Estuaries, *Pollutant identification.
Identifiers: *Bioaccumulation, *Finfish, *Tissue analysis, Platycephalus bassensis, *Derwent estuary(Tasmania).

Total mercury concentrations were reported for 258 individuals representating 16 species of finfish from the Derwent Estuary, Tasmania. Mercury concentrations in the muscle tissue varied between 0 and 2.0 milligrams/kilogram in one specimen of shark. Irrespective of species, the area containing Ralphs Bay contained a higher precentage of fish with mercury concentrations> 0.5 milligrams/kilogram than any other area of the estuary. The fish's position in the food chain appeared to be an important factor determining its mercury content. 51% of individual fish of species whose diet consisted of other fish had mercury concentrations > 0.5 milligrams/kilogram. In contrast, 24% of invertebrate predators and only 7% of individuals of herbivorous habit and mercury concentrations>0.5 milligrams/kilogram. (Klein)
W76-00871

IN VITRO INHIBITION OF FISH BRAIN ATPASE ACTIVITY BY CYCLODIENE INSECTICIDES AND RELATED COMPOUNDS,
Minnesota Univ., St. Paul. Dept. of Entomology, Fisheries and Wildlife.
For primary bibliographic entry see Field 5C.
W76-00874

TRACE METAL LEVELS IN BEACH DIPTERANS AND AMPHIPODS,
Stanford Univ., Pacific Grove, Calif. Hopkins Marine Station.
J. A. Bender.
Bulletin of Environmental Contamination and Toxicology, Vol 14, No 2, p 187-192, August 1975, 4 fig, 9 ref.

Descriptors: *Amphipoda, *Diptera, *Insects, *Metals, Heavy metals, Beaches, Copper, Cadmium, Iron, Zinc, Analytical techniques, Ecosystems, Nickel, Managanese, *Trace elements, Pollutant identification, *California.
Identifiers: *Beach flies, *Beach hoppers, Silver, Bioaccumulation, Coelopa vanduzeei, Fucellia rufitibia, Orchestoidea corniculata, Orchestoidea californiana, Monterey Peninsula(Cal).

Beach hoppers and flies were collected from four points on the Monterey Peninsula, California. The beach flies (Coelopa vanduzeei, Fucellia rufitibia) showed higher levels of Zn, Fe, Cu and Cd than did amphipods (Orchestoidea corniculata, O. californiana). Variations in trace metal levels on one beach over time were plotted. Great Fe fluctuations occurred while manganese, Cd, Ag and Ni showed stable levels. Cu, Pb and Zn showed moderate fluctuations. Differences in feeding habits, absorption, and metabolism between the dipterans and amphipods were discussed with reference to the variations in the metal levels. (Klein)
W76-00877

MERCURY LEVELS IN GEORGIA OTTER, MINK, AND FRESHWATER FISH,
Duke Power Co., Charlotte, N.C. Design Engineering Dept.
P. M. Cumbie.
Bulletin of Environmental Contamination and Toxicology, Vol 14, No 2, p 193-196, August 1975, 2 tab, 10 ref.

Descriptors: *Heavy metals, *Toxicity, *Mercury, Fish, *Bass, *Suckers, *Mink, *Otters, Path of pollutants, Environmental effects, Food chains, Fish physiology, Animal physiology, Ecosystems, Pollutant identification, *Georgia, Lethal limit.
Identifiers: *Gar, *Largemouth Bass, *Chain pickerel, *Bowfin, Bioaccumulation, *Chubsucker, *Redfin pickerel, Lutra canadensis, Micropterus salmoides, Esoxniger, Amia calva, Lepisosteus, Esox americanus, Tissue analysis, *Swannee River(Geo).

The presence of mercury in fish of relatively unpolluted Georgia lower Coastal Plain streams resulted in accumulation of mercury by otter (Lutra canadensis) and mink (Mustela vison) which feed on these fish. Mercury concentrations detected in axial muscles of the fish-largemouth bass (Micropterus salmoides), chain pickerel (Esox niger), bowfin (Amia calva), gar (Lepisosteus), chubsucker (Erimyzon obloengus) and Redfin pickerel (Esox americanus), ranged from 0.12-1.40 ppm. The effects of sublethal mercury concentrations on food chains and ecosystems were discussed. (Klein)
W76-00878

IN SITU COLOUR MEASUREMENTS ON THE GREAT LAKES,
Canada Centre for Inland Waters, Burlington(Ontario).
K. P. B. Thomson, and J. Jerome.
Environment Canada, Scientific Series No. 51, 1975. 11 p, 3 fig, 5 tab, 10 ref.

Descriptors: *Color, *Great Lakes, *Analytical techniques, *Optical properties, *Physical properties, Light, Water analysis, Water pollution effects, Water quality, Lake Ontario, Lake Superior, Surface waters, Suspended solids, Turbidity, Suspension, Productivity, Biology, Plant growth, Measurement, On-site investigations, On-site tests, Lakes, Limnology, Sediment load, Algae.
Identifiers: *Color measurements, *Spectral irradiance, *Optical measurements, Biological activity, Tristimulus values, Luminosity, Quanta spectrometer.

Measurements of upwelling and downwelling spectral irradiance have been used to compute in situ color for Lakes Ontario and Superior. The computations of the color were based on the CIE chromaticity system. Tristimulus values for a network of stations and a number of different time periods were analyzed with reference to limnological parameters. The analysis showed that suspended inorganic material and biological activity affect the in situ color in characteristic ways. In effect, three principal water regimes can be identified by their characteristic or dominant wavelength. These are clear water with little dissolved or suspended substances, water that is biologically productive, and water with heavy sediment loading. The in situ color also indicates basic differences between the two lakes that are related to their productivity. (Henley-ISWS)
W76-00885

SUMMARY OF GROUND WATER QUALITY IN THE LOS ANGELES DRAINAGE PROVINCE,
California Dept. of Water Resources, Los Angeles. Southern District.
For primary bibliographic entry see Field 7C.
W76-00888

DILUTION AND DECAY OF AQUATIC HERBICIDES IN FLOWING CHANNELS,
Commonwealth Scientific and Industrial Research Organization, Griffith (Australia). Div. of Irrigation Research.
For primary bibliographic entry see Field 5B.
W76-00895

PRECIPITATION: ITS ACIDIC NATURE,
Pittsburg Univ., Pa. Dept. of Occupational Health.
For primary bibliographic entry see Field 2K.
W76-00900

IN SITU SOIL GAMMA ANALYZER--A NEW APPROACH TO DETERMINE THE MOVEMENT OF POLLUTANTS IN SOILS.
National Environmental Research Center, Las Vegas, Nev.
J. C. McFarlane, K. W. Brown, and R. R. Kinnison.
Soil Science, Vol. 120, No. 2, p 140-146, August 1975. 4 fig, 4 ref, 1 append.

Descriptors: *Pollutant identification, *Nuclear meters, *On-site investigations, *Radioactivity, *Soil contamination, Soils, Soil analysis, Evaluation, Soil tests, Instrumentation, Gamma rays, Radiation, Analytical techniques, Radioactivity techniques, Soil chemistry, Trace elements, Path of pollutants, Radioisotopes.
Identifiers: *Soil gamma analyzer, *Gamma analyzer, *On-site analyzer, Automatic analysis, Gamma-emitting material.

The in situ soil gamma analyzer is an instrument constructed to measure the position of gamma-emitting trace elements in soil. It consists of a solid state scintillator, a lead shield with a 3-mm-wide horizontal window, and a portable analyzer. When the detector is lowered into a circular excavation dug vertically into the soil of interest, the gamma activity of the tracer is plotted as a function of depth thus yielding a profile of the tracer distribution. Because of a broad base profile in the original plotted data, which is due to soil attenuation and the lack of collimation, a computer program was written to replot the distribution pattern to within + or -1 mm of actual position. By making a series of time-related measurements, the rate of pollutant movement in soil is obtained. (Henley - ISWS)
W76-00912

ODOR INTENSITIES AT CATTLE FEEDLOTS,
Texas Agricultural Extension Service, College Station.
J. M. Sweeten, D. L. Reddell, L. M. Schake, and B. Garner.
Presented at the 1st Annual Symposium on Air Pollution Control in the Southwest, Texas A and M University, College Station, Texas, November 5-7, 1973, 17 p. 3 fig, 7 tab, 29 ref.

Descriptors: *Odor, *Feed lots, *Cattle, Air pollution, Runoff, Farm wastes, Measurement, Weather data, Moisture, Settling basins.
Identifiers: *Scentometer, *Calcium bentonite, Odor intensity index.

Odor intensities measured at two cattle feedlots in Texas, ranged from 2 to 170 dilutions to threshold (DT) which nearly covered the measurement range of the scentometer. The average odor reading for the surface of a 4000 head feedlot, determined by monitoring four randomly selected pens for 7 months, was 30.7 DT. The runoff settling basin and retention pond averaged 68 and 47 DT, respectively. Half of the odor intensities were more than 23 DT (which exceeds the odor standards in several states). At a 12,000 head feedlot, trials using calcium bentonite as a ration supplement (at 0.0, 0.8, and 2.0% levels) showed a reduction in odors from the 2% bentonite treatment. Bentonite also improved average daily gain of cattle during the first 21 days. The scentometer was found to be a useful, if somewhat imprecise, diagnostic tool for identifying the primary sources of odors within a cattle feedlot. (Russell-East Central)
W76-00919

NUCLEAR SHIP POLLUTION: NATIONAL AND INTERNATIONAL REGULATION AND LIABILITY,
For primary bibliographic entry see Field 6E.
W76-00921

UNION OIL CO. V OPPEN: RECOVERY OF A PURELY ECONOMIC LOSS IN NEGLIGENCE (NOTE ON CASE ARISING FROM OIL SPILL).
For primary bibliographic entry see Field 6E.
W76-00924

5B. Sources Of Pollution

THE EFFECTS OF STREAM CHANNELIZATION OF THE DISTRIBUTION OF NITRIENTS AND METALS,
East Carolina Univ., Greenville, N.C. Dept. of Biology.
C. W. O'Rear, Jr.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-246 193, $4.25 in paper copy, $2.25 in microfiche. North Carolina Water Resources Research Institute, Raleighs, UNC-WRRI Report No 108, August 1975. 52 p, 14 fig, 31 tab, 29 ref, append. OWRT A-080-NC (3). 14-31-0001-4033.

Descriptors: *Channel Improvement, *Nutrients, Phosphorus, Nitrogen, Swamps, Chemical analysis, Chemical precipitation, *Metals, Aquatic plants, Water temperature, Oxygen, Sediment, *Water quality, *North Carolina, *Path of pollutants, *Distribution patterns, Dissolved solids, Dissolved oxygen.
Identifiers: *Channelization, Swift Creek(NC), Nutrient concentrations, Chicod Creek(NC), Ammonia-nitrogen.

The project was designed to determine the distribution patterns of nutrients and metals in channelized and unchannelized stream segments and to determine if modifications occur in the distribution of nutrients. Adjacent segments of Swift Creek, Pitt County, North Carolina were used as the sites. An upstream segment channelized in 1937 was used as a representative natural stream while a segment approximately one kilometer downstream, channelized in 1965, was used as a representative channelized stream. Sampling was performed from September, 1973, through November, 1974. Water temperature in the natural segment tended to be lower than in the channelized segment due to a greater canopy cover in the natural segment. Dissolved oxygen in the channelized segment was consistently higher during low flow periods with average differences exceeding 2 mg/l. Most of the nitrogen and phosphorus moved through both stream segments during the high flow periods. The highest concentrations were observed during the low flow period of October through December. Ammonia-N accounted for most of the increased nitrogen concentrations while particulate phosphorus accounted for the rise in total phosphorus. Nutrient concentrations in Chicod Creek were lower than the unchannelized segment of Swift Creek. Modification of the nutrient distribution patterns could not be directly determined from the measured nutrient concentrations and flows. Dissolved metal concentrations between the two segments showed no significant differences. (Stewart-North Carolina State)
W76-00501

IMPACT OF FREEZING AND THAWING SOIL CONDITIONS ON THE MOVEMENT OF NUTRIENTS FROM RURAL LANDS,
Wisconsin Univ., Madison. Dept. of Agricultural Engineering.
G. D. Bubenzer, and J. C. Converse.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-246 190, $3.75 in paper copy, $2.24 in microfiche. Wisconsin Water Resources Center, Madison, Technical Report, September 1975. 43 p, 16 tab, 6 fig, 23 re. OWRT B-076-WIS (3). 14-31-0001-3946.

Descriptors: *Farm wastes, *Agricultural runoff, *Soil contamination, *Ammonia, *Nitrogen, *Water pollution, *Water quality, *Experimental models, Movement, *Wisconsin, *Path of pollutants.

A model was developed to predict transformations and vertical movement of manurial nitrogen through unsaturated soil profiles following early spring manure application. Processes treated in the model include water movement in unsaturated soil, nitrate dispersion due to mass flow and the nitrogen transformations of mineralization and nitrification. Output from the model includes the vertical nitrate distribution in the soil and the amount of nitrate leaching from the soil profiles. The pollution potential of snowmelt from areas spread with manure was investigated. Urinal and fecal wastes were placed in runoff boxes at the base, midpoint and top of 20cm snow packs. The units were subjected to carefully controlled temperature fluctuations ranging from 8 to 12 degrees C. Urinal losses were determined primarily by the quantity of water which passed through the manure layer. Fecal nitrogen losses were much lower than urinal losses. Freezing and thawing actions were important factors which influenced the fecal nitrogen losses. Runoff and nutrient losses from ten alfalfa plots were monitored for a 3-year period. Dairy cattle manure was applied in the fall, winter and spring at the rate of 2.25 g/square mile (Wet weight basis). Annual precipitation for the 3-year period ranged from 105.4 to 108.3 cm with approximately 12% (Water equivalent) in the form of snow. The average annual runoff from the check, fall, winter and spring applied manure plots was 13.6, 7.3, 10.4 and 10.6 cm, respectively. No significant differences were observed in the nutrient losses from the various treatments.
W76-00502

FORECASTS OF THE EFFECTS OF AIR AND WATER POLLUTION CONTROLS ON SOLID WASTE GENERATION.
Stone (Ralph) and Co., Inc., Los Angeles, Calif.
For primary bibliographic entry see Field 5D.
W76-00510

IDENTIFICATION OF OBJECTIONABLE ENVIRONMENTAL CONDITIONS AND ISSUES ASSOCIATED WITH CONFINED DISPOSAL AREAS,
Little (Arthur D.), Inc., Cambridge, Mass.
J. E. Harrison, and L. C. Chisholm.
Available from the National Technical Information Service, Springfield, Va 22161, as AD/A-000 895, $7.25 in paper copy, $2.25 in microfiche. Army Waterways Experiment Station, Vicksburg, Mississippi, Environmental Effects Laboratory. September, 1974. 134 p, 24 fig, 15 tab, 108 ref, 3 append.

Descriptors: *Waste disposal, *Environmental effects, Land use, Land management, On-site investigations, Public rights, Dikes, Wetlands.
Identifiers: Land application, Dredged material.

Four on-site investigations at the United States Army Engineering District areas of Mobile, Portland, Norfolk, and Detroit were conducted to study objectionable conditions associated with confined disposal of dredged material. Problems involve: conditions associated with disposal area ineffectiveness, such as dike failures; conditions associated with biological, chemical, or physical changes caused by the disposal area; and issues associated with site selection such as ecological effects and changes in land management and use. Public attitudes toward confined disposal appear to be related to past experiences. Current technology is able to deal with the prevention of dike failure, seepage, channelization, and dike erosion, but is not able to solve the problem of standing water in disposal areas. Ecological issues have been centered upon the wetlands as disposal sites and the ultimate use and control of such areas. It was suggested that alternative disposal procedures be implemented, asuch as pumping inland, to avoid disruption of ecologically-sensitive wetland areas. (Kramer-FIRL)
W76-00516

GROUND WATER POLLUTION FROM SUBSURFACE EXCAVATIONS: PART V, OTHER TYPES OF WELLS.
Environmental Protection Agency, Washington, D.C.
Water Well Journal, Vol 28, No 8, p 59-62, August, 1974.

Descriptors: *Water pollution, *Well, Disposal wells, Sewage disposal, Desalination, Underground storage, Geothermal studies, Regulation, Excavation.
Identifiers: Prevention.

Other wells include types used in conjunction with oil exploration and production, solution mining, geothermal energy production, sewage treatment, desalinization, radioactive waste disposal, underground gas storage and water exploration and production. Many of the technical and regulatory aspects previously described in part IV of this study apply to these wells. (See also W74-09929) The differences are discussed. For example, gas storage wells present a potential for contamination of ground water by leakage of gas through the confining beds, through abandoned improperly plugged wells, or through inadequately constructed gas injection or withdrawal wells. Gas could also escape from an overpressured field and migrate laterally in the storage aquifer. (Bradbeer-NWWA)
W76-00525

GROUND WATER POLLUTION FROM SUBSURFACE EXCAVATIONS. PART IX, LANDFILLS.
Environmental Protection Agency, Washington, D.C.
Water Well Journal, Vol 28, No 12, p 41-44, December, 1974.

Descriptors: *Landfills, *Water pollution sources, Garbage dumps,, Public health, Solid wastes, Leaching, Subsurface drainage, Soil contamination, Monitoring, Waste disposal, Excavation.
Identifiers: Pollution monitoring.

A sanitary landfill is: 'A method of disposal of refuse on land without creating nuisances or hazards to public health or safety, by utilizing the principles of engineering to confine the refuse to the smallest practical area, to reduce it to the smallest practical volume, and to cover it with a layer of earth at the conclusion of each day's operation or at such more frequent intervals as it may be necessary.' Less than 10 percent of the refuse disposal sites in the United States are operated within the accepted definition of a sanitary landfill. The potential hazard of landfills to ground water quality via leachate is a function of the total amount of waste generated, its areal distribution, the composition of the waste itself, and the siting, design, and operation of the fill. Leaching of landfills depends upon a source of water moving through the fill. Possible sources include precipitation, moisture content of the refuse, and ground water in contact with the fill. Effects of climate on leachate are discussed. A long list of control measures is given. These are in general those which exclude water from the landfill, prevent leachate from percolating to ground water, or collect leachate and subject it to biological treatment. Monitoring procedures are suggested including sampling wells around the site. (Bradbeer-NWWA)
W76-00526

GROUND WATER POLLUTION FROM SUBSURFACE EXCAVATIONS, PART X, SEWER LEAKAGE.
Environmental Protection Agency, Washington, D.C.
Water Well Journal, Vol 24, No 1, p 92-95, January, 1975.

Descriptors: *Sewers, *Water pollution, Drainage systems, Subsurface drainage, Water quality control, Leakage, Design, Monitoring, Maintenance, Excavation.
Identifiers: *Influent, Pollution monitoring.

Gravity sewers above the ground water table, and pressure outfalls either above or below it, are common elements of the domestic sewerage system of organized communities. Seasonally, storm sewers involving underground conduits and lined and unlined open channels carry runoff from paved and unpaved land surfaces. A sewer is intended to be water-tight and thus to present no hazard to ground water except when temporarily disrupted by accident. Leakage is in reality a common occurrence, especially from older sewers. Leakage in gravity sewers may result from poor workmanship, cracked or defective pipe sections, breakage of pipe and joining material by tree roots, displacement of pipeline by superimposed heavy loads, rupture due to landslide activity or seismic activity, loss of support due to underground washout, differential settlement, and storm water infiltration surcharging the system causing sewage to back up. Sewer leakage will be less of a hazard to ground water in the future than at present, even though the extent of the systems is certain to increase to accommodate growth. The principal reasons are improved construction and maintenance practices. Control methods include a public policy of maximum concern for water quality protection, organized and identified responsibility for sewer construction and maintenance, a program of inspection at five year intervals, emphasis on personnel training, and exclusion from discharge to public systems of irretrievably hazardous materials. (Bradbeer-NWWA)
W76-00527

GROUNDWATER POLLUTION FROM SUBSURFACE EXCAVATIONS, PART XI, TANK AND PIPELINE LEAKAGE.
Environmental Protection Agency, Washington, D.C.
Water Well Journal, Vol 24, No 2, p 37-41, February, 1975.

Descriptors: *Water pollution, *Groundwater, *Detection, *Control, *Monitoring, *Path of pollutants, Pipelines, Underground, Storage tanks, Radioactive wastes, Petroleum, Excavation.
Identifiers: Tanks, Underground pipeline.

The nature and occurrence of tank and pipeline leakage are described and practices that have been found effective in the control and abatement of ground water pollution are summarized. Emphasis is on petroleum products because they constitute the majority of materials stored or transmitted in subsurface excavation. Leakage of these may be more pervasive than generally realized. This is particularly true for a small installation where installation, inspection, and maintenance standards may be low. The major cause of leakage is corrosion, which attacks both externally and internally. The second greatest cause can be found by aggregating those related to pipeline component, equipment, personnel failure or malfunction. The third greatest cause is line rupture as the result of accidents caused by earth moving equipment. The remaining causes include vandalism, severe weather, lightning, floods, earthquakes and forest fires. Pollution movement is traced. Control methods include leak prevention by protection against corrosion and structural design, containment of leaks (Almost exclusively applied to tanks), or automatic shut-off valves and abatement by removal of soil, by pumping or ditching, by biodegradation, and by chemical action. Monitoring procedures have been developed and implemented by interstate carriers, but may be applied to any underground tank or pipeline. Regular checking of pipeline and tanks is accomplished by throughput monitoring, periodic inspection, and periodic pressure testing. (Bradbeer-NWWA)
W76-00528

FATE OF TRACE METALS IN LOS ANGELES COUNTY WASTEWATER DISCHARGE,
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering; and Massachusets Inst. of Tech., Cambridge. Ralph M. Parsons Lab. for Water Resources and Hydrodynamics.
F. M. M. Morel, J. C. Westall, C. R. O'Melia, and J. J. Morgan.
Environmental Science and Technology, Vol 9, No 8, p 757-761, August 1975. 4 fig, 3 tab, 14 ref.

Descriptors: *Trace elements, *Waste dilution, *Metals, *Sewage effluents, *Waste disposal, *Water chemistry, *California, Water analysis, Chemical properties, Disposal, Drainage water, Chemistry, Domestic wastes, Industrial wastes, Outfall sewers, Inorganic compounds, Sewage treatment, Water pollution sources, Water pollution, Sea water, Estuarine environment, Pollutants, Sediments, Equilibrium, Model studies, Speciation, Heavy metals.
Identifiers: *Los Angeles County(Calif).

A chemical equilibrium model of Los Angeles County sewage outfall was presented which accounts for the chemical speciation of trace metals. Many metals were found in very insoluble sulfide (Zn, Hg, Ag, Cu, Cd, Pb) or oxide (Cr, Fe) forms, while some (Ni, Co, Mn) were relatively soluble. A study of the oxidation and dilution of the sewage by seawater demonstrated that most metals tend to be solubilized upon disposal in the ocean and that unmeasurable increments in the natural metal concentrations should result away from the outfall. It was argued that the sewage particulate is not mobilized in the vicinity of the outfall and that the nearby sediments are a mixture of naturally-occurring sediments and sewage particulate. About 0.5% of the sewage particulate--and its metal content--can be accounted for in the reduced area. (Henley-ISWS)
W76-00545

THE USE OF A PELAGIC TROPHODYNAMIC CHAIN FOR STUDYING THE TRANSFER OF METALLIC POLLUTANTS, (IN FRENCH),
Centre dEtudes et de Recherches de Biologie et d'Oceanographie Medicale, Nice (France).
M. Aubert, R. Bittel, F. Laumond, M. Romeo, and B. Donnier.
Rev Int Oceanogr Med. 283 p 27-52, 1972. Illus. (Engl. summ.).

Descriptors: *Seawater, Source of pollutants, Metals, *Pollutants, *Heavy metals, Copper, Zinc, Chromium, Lead, Mercury, *Water pollution.
Identifiers: Pelagic trophodynamic food chain.

Discharges of metallic products in a simple or complexed form into seawater become more and more important. It is necessary to assess the hazards of contamination for man by consumption of marine products. The use of marine food chains permits 'in vitro study of these concentration phenomena. The factors of transfer of different metals may be measured at each level of the pelagic food chain. The transfer of 5 heavy metals Cu, Zn, Cr, Pb and Hg was studied in an ionic or complexed form.--Copyright 1974, Biological Abstracts, Inc.
W76-00577

A PROBLEM IN THE USE OF INSECTICIDES IN PADDY FIELDS IN WEST MALAYSIA: A CASE STUDY,
Ministry of Agriculture and Lands, Kuala Lumpur (Malaysia). Div. of Agriculture.
Ahmad Yunus, and Lim Guan Soon.
Malays Agric J. Vol 48, No 2: p 167-183. 1971 Illus.

Descriptors: *Insecticides, Water pollution, *Fish toxins, Fish, *Water pollution sources, *Water pollution effects, Dieldrin, Endrin.
Identifiers: Azinophos, BHC, Carbaryl, Endosulfan, Ethyl, Fenitrothion, Fenthion, Malathion, Malaysia, Paddy fields.

A field survey to determine the problem of fish toxicity arising from the use of insecticides in paddy fields was carried out in 2 of the major paddy growing areas, Province Wellesley in the State of Penang and Krian District in the State of Perak in Jan.-Apr., 1970. Ninety percent of the farmers used insecticides to control insect pests on their crops. Insecticides commonly used were endosulfan, carbaryl and BHC. In general, spot application was more popularly practices than blanket and prophylatic treatments. Hence the quantity of insecticide used per crop was relatively small. Among the above chemicals, only endosulfan caused acute toxicity to paddy field fishes. However, killing of the fishes by BHC, azinophos-ethyl, dieldrin and endrin was observed in Krian, due to the higher rates of application employed. No fish mortality was observed in the connecting ponds and irrigation canals adjacent to paddy fields. Paddy field fishes provided additional income to 35% of the farmers surveyed. Apart from the income, the fishes also served as the main daily source of protein in their food. The use of endosulfan which is effective in controlling stem borers, should be avoided in areas where fishes are considered important and BHC (applied at not more than 2 lb. a. i./acre) could be used in its place. Insecticides such as dieldrin, endrin and azinophos-ethyl which show strong piscicidal effect should also be avoided in such areas. The use of malathion, carbaryl, fenitrothion and fenthion can be continued. There is a need to extend the survey to other paddy growing areas.--Copyright (c) 1974, Biological Abstracts, Inc.
W76-00581

PREDICTION OF ASSIMILATION CAPACITY IN RECEIVING STREAMS, PART I,
Oklahoma State Univ., Stillwater. Dept. of Civil Engineering.
A. F. Gaudy, Jr.
Water and Sewage Works, Vol 122, No 5, p 62-65, May, 1975. 3 fig.

Descriptors: *Waste assimilative capacity, *Dissolved oxygen, Biochemical oxygen demand, Oxygen sag, Oxygenation, Waste water disposal, Analytical techniques, Rivers, Measurement, *Forecasting.

The practical method described for predicting the dissolved oxygen profile has been used for studying the assimilation capacity of a portion of the Red River in Oklahoma. This method overcomes some of the problems associated with the use of the Streeter-Phelps say equation which have led to a lack of accurate prediction. The Streeter and Phelps concept states that the dissolved oxygen profile is the result of deoxygenation due to introduction of organic pollutants, and reoxygenation due to mass transfer of oxygen from the atmosphere. The integrated form of a mathematical expression of this concept is known as the 'sag equation'. A better expression for the sag equation would be to describe it as a function of reaeration minus oxygen uptake. A rationale for this description is presented. The only BOD curve that can be expected to hold true for the receiving stream situation is one obtained by using the same dilution as that expected in the receiving stream. This is not always possible using the normal closed bottle BOD dilution technique. A stirred open jar reactor system is proposed as an improved practical method for estimating BOD curves rather than the standard closed bottle technique. The first step is to add the effluent and the receiving stream water in the desired proportion and aerate the system to bring the DO level close to the saturation concentration. A portion of acclimated seed is then added to the river water. After initiating the experiment, the dissolved oxygen profile is determined electrometrically. (See also W76-00601) (Orr-FIRL)
W76-00600

PREDICTION OF ASSIMILATION CAPACITY IN RECEIVING STREAMS, PART II,
Oklahoma State Univ., Stillwater. Dept. of Civil Engineering.
A. F. Gaudy, Jr.
Water and Sewage Works, Vol 122, No 6, p 78-79, June, 1975. 2 tab, 17 ref.

Descriptors: *Waste assimilative capacity, *Forecasting, *Dissolved oxygen, Streams, Oxygen demand, Biochemical oxygen demand, Analytical techniques, Waste water disposal.
Identifiers: Effluent discharges, Oxygen uptake curve.

A procedure for predicting the dissolved oxygen profile from the calculated oxygen uptake curve in streams receiving effluent discharges is outlined. The procedure has been used to determine the assimilation capacity of part of the Red River in Oklahoma. The dissolved oxygen saturation value and the reaeration constant K2 are calculated; deficit is computed, multiplied by the K2 value, and recorded. The time interval and the average values during the time interval are taken. From this, the change in dissolved oxygen (DO) concentration may be computed as the oxygen uptake during a particular interval. By repeated calculations, a representative average accumulated oxygen uptake curve (BOD curve) may be made for the effluent-river water mixture. From this curve, the dissolved oxygen profile may be computed. In this case, oxygen uptake for BOD values was read off at even hour intervals. After accounting for the amount of deficit from saturation, the amount of oxygen added during each time interval was obtained by multiplying the reaeration constant (K2) by the deficit value and delta time. Calculations are easily computer programmed. In many receiving stream situations, K2 does not remain constant and must be adjusted for each successive downstream reach. For open jar reactor techniques, it is suggested that preliminary and training runs be used. While this method is still under investigation, it has been successfully used to make an engineering prediction of the impact of an effluent on the DO of a resource. (See also W76-00600) (Kramer-FIRL)
W76-00601

GAS CHROMATOGRAPHIC (ECD) DETERIMINATION OF COPROSTANOL AND CHOLESTEROL AS INDICATORS OF FECAL POLLUTION IN WATER, (IN JAPANESE),
Ehime Univ., Matsuyama (Japan). Dept. of Chemistry.
For primary bibliographic entry see Field 5A.
W76-00602

NEW ORLEANS DRINKING WATER SOURCES TESTED BY GAS CHROMATOGRAPHY MASS SPECTROMETRY, OCCURRENCE AND ORIGIN OF AROMATICS AND HALOGENATED ALIPHATIC HYDROCARBONS,
New Orleans Univ., La. Dept. of Biological Sciences.
For primary bibliographic entry see Field 5A.
W76-00603

CHEMICAL COMPOSITION OF ORGANIC COMPOUNDS PRESENT IN WATER OF THE TAMAGAWA RIVER, (IN JAPANESE),
For primary bibliographic entry see Field 5A.
W76-00606

DEVELOPMENT OF A GROSS POLLUTION DETECTOR: LABORATORY STUDIES,
Severn-Trent Water Authority, (England).
For primary bibliographic entry see Field 5A.
W76-00609

DEVELOPMENT OF A GROSS POLLUTION DETECTOR: FIELD TRIALS,
Severn-Trent Water Authority, (England).
For primary bibliographic entry see Field 5A.
W76-00610

ORGANIC RESIDUE IN RECYCLED EFFLUENT, PART II,
Utah State Univ. Logan.
For primary bibliographic entry see Field 5D.
W76-00646

GROUND-WATER QUALITY BENEATH SOLID-WASTE DISPOSAL SITES AT ANCHORAGE, ALASKA,
Geological Survey, Anchorage, Alaska.
C. Zenone, D. E. Donaldson, and J. J. Grunwaldt.
Open-file report, 1974. 23 p, 8 fig, 2 tab, 9 ref.

Descriptors: *Landfills, *Alaska, *Water pollution sources, *Path of pollutants, Leachate, Groundwater movement, Hydrogeology, Water table, Water quality, Waste disposal, Garbage dumps, Solid wastes.
Identifiers: *Anchorage(Alaska).

At three solid-waste disposal sites in the Anchorage area of Alaska, differences in local geohydrologic conditions influence groundwater quality. Leachate was detected in groundwater within and beneath two sites where the water table is very near land surface and refuse is deposited either at or below the water table in some parts of the filled areas. No leachate was detected in groundwater beneath a third site where waste disposal is well above the local water table. (Woodard-USGS)
W76-00656

DISCOVERY OF THE GASTROPOD SNAIL MELANOIDES (THIARA) TUBERCULATA (MULLER) IN FLORIDA,
Geological Survey, Miami, Fla.
T. N. Russo.
Florida Scientist, Quarterly Journal of the Florida Academy of Sciences, Vol 36, No 2-4, p 212-213, 1973. 1 tab. 5 ref.

Descriptors: *Water pollution sources, *Snails, *Florida, Surface waters, Public health, Human diseases, Toxicity, Gastropods, Parasitism, *Animal parasites.
Identifiers: *Melanoides tuberculata.

The first known colonies of the oriental snail Melanoides tuberculta were collected in South Florida in 1971. The snails were found in both fresh and brackish canal waters. Melanoides is also known to be an intermediate host of a human parasite Philohthalmus sp. Both the snail and the paraside are prevalent in the Orient and have been reported in San Antonio, Texas. The potential for human infestation does exist in Florida with the presence of the intermediate host but is probable unlikely. (Woodard-USGS)
W76-00660

DISTRIBUTION OF RADIONUCLIDES IN THE COLUMBIA RIVER STREAMBED, HANFORD RESERVATION TO LONGVIEW, WASHINGTON,
Geological Survey, Reston, Va.
W. L. Haushild, G. R. Dempster, Jr., and H. H. Stevens, Jr.
Available from Supt of Docuements, GPO, Wash, DC, 20402, price $1.20. Professional Paper 433-O, 1975. 35 p, 12 fig, 11 tab, 21 ref.

Descriptors: *Path of pollutants, *Nuclear wastes, *Columbia River, *Washington, *Nuclear reactors, Carriers, Radiosotopes, Sediments, Sediment transport, Particle size, Distribution patterns, Streambeds, Bottom sediments, Streamflow, Data collections.
Identifiers: *Hanford Reservation(Wash).

Until all the eight reactors at Hanford Reservation, Washington, cooled by once-through flow of treated Columbia River water, were shut down in 1971, their cooling-water effluent was the main source of dissolved and particulate radionuclides in the Columbia River. The distribution and quantities of radionuclides accumulated in the riverbed were investigated. Chromium-51 and scandium-46 usually had a greater affinity for fixation to fine sediment, relative to coarse sediment, than did zinc-65 or cobalt-60. Radionuclide concentrations in both coarse sediment and fine sediment did not vary significantly (95 percent confidence level) within relatively long river reaches. In June 1965, 28,900 curies of radionuclides were estimated to be in the Columbia River streambed from the reactors to the ocean: 20,200 curies in the riverbed, and 8,700 curies in the estuary bed (Hubbell and Glen, 1973). A predominance of chromium-51 over zinc-65 in the estuary bed and an opposite predominance in the riverbed indicate less seasonal variation in the accumulation of radionuclides (epecially chromium-51) in the estuary bed than in the riverbed. (Woodard-USGS)
W76-00664

FLOW ESTABLISHMENT AND INITIAL ENTRAINMENT OF HEATED WATER SURFACE JETS,
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
H. Stefan, L. Bergstedt, and E. Mrosla.
Available from the National Technical Information Service Springfield, Va 22161 as PB-243-744. Environmental Protection Agency Report EPA-660/3-75-014, May 1975. 141 p, 36 fig, 5 tab, 15 ref, 2 append. R-800-435.

Descriptors: *Mathematical models, Outlets, Flow rates, *Thermal pollution, Discharge(Water), Water quality, Water quality control, Water pollution, Water pollution control, Experimental data, Flow, Mixing zone, Dilution, Heated water, *Jets, Path of pollutants.
Identifiers: *Thermal plumes, Surface discharge, Heated water jet, Jet flow, Buoyant jets, Zone of flow.

Mathematical modeling of the zone of flow (re-)establishment (ZFE) of heated water surface jets has been found to be difficult because of the complex dependence on outlet geomtry, discharge velocity, buoyancy, and ambient currents. Laboratory experiments have therefore been conducted to provide more observations and data on flow patterns, temperatures, and flow velocities in the ZFE and some distance beyond. From this information, relationships giving the length of the ZFE, the volumetric flow rates versus distance, and the initial spreading angle have been derived. The independent variables were outlet aspect ratio, outlet densimetric Froude number, and cross-flow ratio. The relationships provided can be used to make more accurate temperature predictions in the immediate vicinity of a heated water surface channel. (EPA)
W76-00679

URBAN STORMWATER MANAGEMENT MODELING AND DECISION-MAKING,
Florida Univ., Gainesville. Dept. of Environmental Engineering Sciences.
For primary bibliographic entry see Field 5D.
W76-00695

CONTRIBUTIONS OF URBAN ROADWAY USAGE TO WATER POLLUTION,
Biospherics Inc., Rockville, Md.
D. G. Shaheen.
Available from the National Technical Information Service Springfield, Va 22161. Environmental Protection Agency, Report EPA-600/2-75-004, March 1975. 346 p, 20 fig, 28 tab, 17 ref, 10 append. 1BB034 Roap/Task 21 ASY 05. EPA 68-01-0197.

Descriptors: *Water pollution sources, *Storm runoff, Surface runoff, *Urban runoff, Nutrients, *Heavy metals, *Asbestos, *Rubber, Solid wastes, District of Columbia, Roads.
Identifiers: Inorganic wastes, *Street surface contaminants, Grease, Washington, D. C.

Street surface contaminants are deposited on roadways from many sources within an urban area. Industrial operations, land use activities, fallout of air pollutants, roadway usage and other activities contribute to the loading of particulates on urban roadways. These materials are then carried into receiving waters by storm runoff where they constitute a substantial portion of the overall water pollution problems of cities. Metropolitan Washington, D.C., with its low background of industrial emissions, was the area chosen for study of contributions of motor vehicle usage to urban roadway loading factors. Specific roadway study sites within this area were selected so as to provide minimal interference from nontraffic-related land use activities and thus isolate, as much as possible, the traffic-related depositions. Motor vehicular traffic is directly or indirectly responsible for deposition of substantial quantities of materials on roadways in urban areas. Significant levels of toxic heavy metals and asbestos and slowly biodegradable petroleum products and rubber are deposited directly from motor vehicle along with large quantities of particulate materials contributed indirectly by traffic. The particulates contribute indirectly by traffic are largely inorganic, but have associated with them solids and nutrients which represent a serious source of water pollutants in all metropolitan areas. (EPA)
W76-00696

TCA IN IRRIGATION WATER AFTER BANK TREATMENTS FOR WEED CONTROL,
Agricultural Research Service, Prosser, Wash. Irrigated Agriculture Research and Extension Center.
R. D. Comes, P. A. Frank, and R. J. Demint.
Weed Science, Vol 23, No 3, p 207-210, May, 1975. 3 tab, 9 ref.

Descriptors: *Herbicides, *Weed control, *Irrigation water, *Water pollution, Plant growth regulators, Irrigation ditches, Embankments, Irrigated land, Bank protection, Water pollution sources, Defoliants, Agricultural chemicals, Water analysis, Water quality, Chemical analysis, Irrigation, *Pollutant identification.
Identifiers: *Trichloroacetic acid(TCA).

Concentrations of trichloroacetic acid (TCA) were determined in irrigation water after the herbicide had been applied to the banks of dry canals at 82 kilograms/hectare for weed control. When the canals were refilled about 5 months after treatment, maximum concentrations of TCA detected in the water ranged from 53 to 297 parts per billion (ppb). The concentration was highest during the first hour of water flow with maximum concentration increasing at a rate of 26 to 30 ppb/kilometer of treated canal flow, unless surface runoff or reduced flow volumes caused abnormal canal flows. With one exception, no TCA was detected in the water after 4 hours of flow. In the 6 experiments conducted, the highest average concentration of TCA during the first 240 minutes of water flow was 50 ppb. Calculations show that only 2.4 cm of water could be applied in the initial 240 minute period and that if the highest average concentration were used as a base value, only 12g of TCA would be applied by the water to 1 hectare of cropland. (Robinett-Arizona)
W76-00706

FIELD STUDY OF SOLUTE MOVEMENT IN A HIGHLY AGGREGATED OXISOL WITH INTERMITTENT FLOODING: II. PICLORAM,
Hawaii Univ., Honolulu, Dept. of Agronomy and Soil Science.
P. S. C. Rao, R. E. Green, V. Balasubramanian, and Y. Kanehiro.

Journal of Environmental Quality, Vol 3, No 3, p 197-202, July-September, 1974. 2 fig, 1 tab, 16 ref.

Descriptors: *Pesticides, *Herbicides, Soil chemistry, Water quality, Groundwater, Irrigation, Soil profiles, *Path of pollutants, Water pollution sources.
Identifiers: *Picloram.

Most of the applied herbicide picloram was retained in the top 40-cm depth of the Molokai soil with cumulative applications of 48 to 74 cm water following application of the chemical to the soil surface. Although movement of the picloram peak was retarded more than was anticipated from equilibrium adsorption measurements, a significant fraction of the applied herbicide moved ahead of the peak deep into the profile (down to the 143-cm depth) after a single application of 24-cm water. Rapid flow through macropore sequences combined with temporary retention of picloram in aggregate micropores appear to be responsible for the unusual pattern of movement. Published data for nitrate movement in the same field plots of Molokai soil were compared with picloram movement data to provide a measure of the relative mobility of these solutes. A comparison of the results reported here with published field data of solute leaching in other soils indicated a greater retardation of solute peak movement in Molokai soil than in less aggregated soils. (Skogerboe-Colorado State)
W76-00718

DIFFERING SENSITIVITY OF CORN AND SOYBEAN PHOTOSYNTHESIS AND TRANSPIRATION TO LEAD CONTAMINATION,
Illinois Univ., at Urbana-Champaign.
F. A. Bazzaz, G. L. Rolfe, and P. Windle.
Journal of Environmental Quality, Vol 3, No 2, p 156-158, April-June, 1974. 3 fig, 15 ref.

Descriptors: *Heavy metals, *Crop response, *Lead, *Corn(Field), *Soybean, Photosystems, Transpiration.

Corn and Soybean plants grown in media containing a range of Pb concentrations supplied as PbC1 (2), showed decreased net photosynthesis and transpiration with increasing Pb treatment levels. At lower Pb treatment levels, corn appears to be more sensitive than soybeans. However, at high treatment levels (62.5-250 mg/plant) soybeans are more sensitive than corn. At 250 mg Pb/plant in the medium, photosynthesis is only 10% of maximum in soybeans but 47% in corn, even though corn Pb tissue content is much higher than that of soybeans. Transpiration exhibited similar trends to photosynthesis suggesting that, especially in corn, an appreciable part of the inhibition of the two processes is related to increased stomatal resistances with increased Pb concentrations. Lead accumulation trends were similar at treatment levels of 0 to 62.5 mg/plant but were slightly different at higher levels. The total amount of Pb accumulated was higher in corn than in soybeans. Maximum accumulation in both species occurred at 62.5 mg Pb/plant. (Skogerboe-Colorado State)
W76-00720

COLUMN STUDIES OF SOIL CLOGGING IN A SLOWLY PERMEAPLE SOIL AS A FUNCTION OF EFFLUENT QUALITY,
Wisconsin Univ., Madison Dept. of Soil Science.
T. C. Daniel, and J. Bouma.
Journal of Environmental Quality, Vol 3, No 4, p 321-326, October-December, 1974. 8 fig, 2 tab, 25 ref.

Descriptors: *Septic tanks, *Soil disposal fields, *Clogging, *Effluents, Chemical oxygen demand, Biochemical oxygen demand, Soil properties, Soil investigations, Soil structure, Soil water movement, Loam.

Clogging as a function of effluent quality was investigated in cores of the very slowly permeable Almena silt loam soil which offers problems for conventional on-site liquid waste disposal. Undisturbed 60 cm long cores were subjected for approximately 120 days to constant ponding with simulated septic tank effluent, extended aeration effluent and distilled water. Column influents and effluents were monitored with respect to chemical oxygen demand (COD), biochemical oxygen demand (BOD), and solid residue fractions. Column influents differed markedly in COD and BOD content but column effluents had consistently low contents indicating the high renovative capacity of the soil. In situ tensiometric, redox, and flow rate measurements indicated development of the most severe barriers to flow in columns ponded with low BOD aerated effluent, followed closely by those ponded with high BOD septic tank effluent. (Skogerboe-Colorado State)
W76-00721

PLANT NUTRIENT LOSSES FROM TILE-OUTLET TERRACES,
Iowa State Univ., Ames. Dept. of Agronomy.
J. J. Hanway, and J. M. Laflen.
Journal of Environmental Quality, Vol 3, No 4, p 351-356, October-December, 1974. 3 fig, 4 tab, 13 ref.

Descriptors: *Nutrient removal, *Nutrients, *Phosphorus, Tile drainage, Sediment, Nitrogen, Nitrification, Sulfur, Runoff, Fertilizer, Fertilization, Tile drains.

Plant nutrient losses in runoff water from four tile-outlet terrace systems in Iowa and in tile drainage from two of the systems were measured annually from April to November over a 3-year period. Soluble P concentrations in surface runoff were related to available P in the surface soils, and concentrations in tile drainage were related to available P in the subsoils. Concentrations of inorganic N varied widely among locations, but were relatively constant at a location. Average annual inorganic N concentrations in surface runoff were 4 ppm or less at three of the four sites and 11 ppm at one site. Concentrations of inorganic N and sulfate S were similar and were lower in surface runoff than in tile drainage. There was no relation between the amounts of fertilizer applied and plant nutrient losses or concentrations in runoff or drainage water. (Skogerboe-Colorado State)
W76-00723

NITRATE AND CHLORIDE LEACHING IN A SWELLING CLAY SOIL,
Agricultural Research Service, Temple, Tex. Blackland Conservation Research Center.
D. E. Kissel, J. T. Ritchie, and E. Burnett.
Journal of Environmental Quality, Vol 3, No 4, p 401-404, October-December, 1974. 4 fig, 3 tab, 9 ref.

Descriptors: *Nitrates, *Chlorides, *Leaching, *Nutrient removal, Soil investigations, Water quality, Lysimeter, Drainage water, Groundwater, Soil water movement.
Identifiers: Nitrate-nitrogen.

Leaching losses of applied NO (3) -N and C1 (-) from a swelling clay soil were measured using an undisturbed field drainage lysimeter. Nitrate-N and C1 (-), applied at 110 and 279 kg/ha, respectively, were detected in drainage water collected at a depth of 125 cm after the first large rainstorm. Applied fertilizer was leached when percolating rainwater carried the applied materials through large connected pores, bypassing other soil water inside soil structural units. Even though applied fertilizer began to be lost with the first rainstorm, concentrations of NO (3) -N and c1 (-) were not high until large amounts of water had drained below the root zone. Much more native soil nitrate was leached than soil nitrate concentrations in unfertilized plots would have indicated. The data indicate that leaching losses of nitrate from mineralization may be greater than those of applied nitrate when accumulated drainage is <50 mm following fertilizer application (Skogerboe-Colorado State)
W76-00724

UPTAKE OF INORGANIC MERCURY BY BED SEDIMENTS,
A. Kudo, and J. S. Hart.
Journal of Environmental Quality, Vol 3, No 3, p 273-278, July-September, 1974. 7 fig, 21 ref.

Descriptors: *Mercury, Rivers, *Sediments, *Kinetics, Water quality, Water pollution, *Canada, *Absorption, *Bottom sediments.
Identifiers: *Ottawa River, Mercuric chloride.

The kinetics of uptake of inorganic mercury as mercuric chloride by a variety of freshwater river sediment types typical of Ottawa River sediments were studied to determine the influence of mercury concentration in water, hydrodynamic effects, sediment depth, aerobic and anaerobic conditions, and two types of water. Uptake appears to depend strongly on concentration of mercury in water and water velocity, and not on sediment depth or water type. No significant difference in uptake rates was observed between aerobic and anaerobic conditions during the 10 days studied. (Skogerboe-Colorado State)
W76-00725

NITRATE CONCENTRATIONS IN DEEP SOIL CORES AS RELATED TO SOIL PROFILE CHARACTERISTICS,
Californai Univ., Riverside. Dept. of Soil Science and Agricultural Engineering.
L. J. Lund, D. C. Adriano, and P. F. Pratt.
Journal of Environmental Quality, Vol 3, No 1, p 78-82, January-March, 1974. 2 fig, 5 tab, 15 ref.

Descriptors: *Denitrification, *Nitrates, *Nitrogen, *Soil profiles, *Soil horizons, Soil investigations.

Fifteen sites within a 30-ha study area were studied to determine the effect of soil profile characteristics on nitrate concentrations below the root zone. The N input, crop removal of N, and water management were similar for all sites during the previous 6 years. The soils of the study area were primarily Alfisos and Entisols of fine-loamy, coarse-loamy, sandy and sandy over loamy families. Nitrate concentrations varied between sites and with depth. The average nitrate concentrations below the root zone ranged from 4.9 to 15.3 microg/g when expressed on an oven-dry soil basis. Profile characteristics were significantly correlated with the average nitrate concentrations below the root zone. A regression equation relating average nitrate concentration in the 1.8-8 depth to control section characteristics explained 86% of the variability of the nitrate concentration and was highly significant. Hence, to minimize groundwater pollution, soil profile characteristics should be considered in selecting land for high N input whether by fertilization or waste disposal. (Skogerboe-Colorado State)
W76-00726

A SURVEY OF THE BORON CONTENT OF CERTAIN WATERS OF THE GREATER LONDON AREA USING A NOVEL ANALYTICAL METHOD,
Anglian Water Authority, Huntingdon (England). Directorate of Scientific Services.
For primary bibliographic entry see Field 5A.
W76-00727

AN AUTOMATIC PUMPING SAMPLER FOR EVALUATING THE TRANSPORT OF PESTICIDES IN SUSPENDED SEDIMENT,
J. F. Parr, G. H. Willis, L. L. McDowell, C. E. Murphree, and S. Smith.

Journal of Environmental Quality, Vol 3, No 3, p 292-294, July-September, 1974. 1 fig, 3 tab, 7 ref.

Descriptors: *Pesticides, *Sampling, Sediments, Suspended solids, Laboratory tests, Equipment, Water quality, Water pollution sources, Path of pollutants.

Laboratory tests were conducted to evaluate the utility of an automatic pumping sampler for assessing the transport and concentration of pesticides in suspended sediment. Pesticide-sediment-water mixtures were formulated with pesticide-sediment ratios ranging from 1:15,000 to 1:500. After stirring periods of 10 and 60 min, these formulations were pumped through the sampler and aliquots collected for pesticide analysis. Recovery of DDT, trifluralin, toxaphene, and mirex exceeded 90%, based on their concentrations immediately prior to pumping. Adsorption of pesticides to the various plastic, rubber, and fiberglass sampler components was minimized by the high flow velocity and rapid delivery systems which ensured a short time of contact (Seconds) between the sample and internal surfaces. These tests indicate that the sampler is suitable for use in evaluating the transport of relatively water-insoluble pesticides in suspended sediment. (Skogerboe-Colorado State)
W76-00728

PRECIPITATION NITROGEN CONTRIBUTION RELATIVE TO SURFACE RUNOFF DISCHARGES,
Department of Agriculture, Lincoln, Nebr.
G. E. Schuman, and R. E. Burwell.
Journal of Environmental Quality, Vol 3, No 4, p 366-369, Ocotber-December, 1974. 1 fig, 4 tab, 12 ref.

Descriptors: *Nitrates, *Ammonia, Runoff, Watershed management, Water quality, Nitrogen, Precipitation, Water pollution sources, Nutrient removal, *Path of pollutants.

Ammonia and nitrate concentrations in precipitation and surface runoff from two adjacent watersheds, fertilized at 168 and 448 kg N/ha, respectively, were studied to determine the relative contributions of precipitation N in relation to surface runoff N discharge. The data show that 69% of the N discharged by surface runoff from the sampled events could be accounted for by precipitation-originated N on the watershed fertilized at 168 kg N/ha, whereas 53% of the N discharged from the watershed fertilized at 448 kg N/ha could be attributed to N originating in the precipitation. However, the data indicate that, on an annual basis, the surface runoff N discharge accounts for only 20% of that in the total incoming precipitation. This difference can be accounted for by precipitation intensity or duration that did not cause runoff, absorption of NH (4) -N by the soil material, or leaching of NO (3) -N into the soil profile. (Skogerboe-Colorado State)
W76-00729

A SIMULATION MODEL FOR PREDICTION OF HERBICIDE PERSISTENCE,
National Vegetable Research Station, Wellesbourne (England).
A. Walker.
Journal of Environmental Quality, Vol 3, No 4, p 396-401, Ocotber-December, 1974. 5 fig, 1 tab, 10 ref.

Descriptors: *Simulation analysis, *Model studies, *Herbicides, Computer models, Soil investigation, Meteorological data, Water pollution sources, Path of pollutants.

A simulation model for prediction of herbicide persistence in the field is described. The model combines the effects of soil temperature and soil moisture content on the rates of herbidice loss, determined experimentally under controlled conditions, with the flucturations in surface soil temperature and moisture content in the field. The computer program includes methods of simulating surface soil temperatures and moisture contents from standard meteorological data. When data were used in the simulation model in conjunction with the relevant meteorological information, the patterns of loss of napropamide incorporated 2 to 3 cm in the field could be predicted. Napropamide was lost rapidly when applied to the soil surface, and since the model only takes into account losses through microbial or chemical metabolism, this could not be simulated. Some of the limitations and the potential benefit of the simulation technique for prediction of pesticide persistence are discussed. (Skogerboe-Colorado State)
W76-00730

THE CONTROL OF NITRATE ACCUMULATION IN SOILS BY INDUCED DENITRIFICATION,
Technion-Israel Inst. of Tech., Haifa.
Y. Avnimelech, and A. Raveh.
Water Research, Vol 8, p 553-555, August, 1974. 2 fig, 1 tab, 8 ref.

Descriptors: *Nitrates, *Denitrification, Soil chemistry, Irrigation, Sprinkler, Irrigation, Irrigation effects, Soil profiles, Water pollution control, Path of pollutants.
Identifiers: *Israel.

Large amounts of nitrates are accumulating in the Hula Valley soils and then subsequentiy being leached to the Sea of Galilee. The nitrate concentration in the soil has been significantly reduced by induced denitrification. Reducing conditions have been achieved by controlled sprinkling of previously dried soil. (Skogerboe-Colorado State)
W76-00732

EFFECT OF SALTS AND SALTS PLUS NITROGEN-15-LABELED AMMONIUM CHLORIDE ON MINERALIZATION OF SOIL NITROGEN, NITRIFICATION, AND IMMOBILIZATION,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
For primary bibliographic entry see Field 3C.
W76-00735

NITRIFICATION RATE IN BIOLOGICAL PROCESSES,
Metcalf and Eddy, Inc., Boston, Mass.
For primary bibliographic entry see Field 5D.
W76-00738

PROBLEMS OF SCALE AND DETAIL IN ECOLOGICAL MODELLING,
Utah State Univ., Logan. Ecology Center.
For primary bibliographic entry see Field 6G.
W76-00739

MORE ON AN APPROXIMATE SOLUTION FOR NONLINEAR DIFFUSION,
Cornell Univ., Ithaca, N.Y. Coll. of Engineering.
For primary bibliographic entry see Field 2G.
W76-00740

AGRICULTURAL WASTE MANAGEMENT,
American Society of Civil Engineers, New York. Environmental Engineering Div.
For primary bibliographic entry see Field 5G.
W76-00744

INCREASING INTENSIFICATION OF PLANT PRODUCTION AND THE PROBLEM OF CHANGES IN THE NATURAL ENVIRONMENT,
Polish Academy of Sciences, Warsaw. Inst. on Agricultural and Forestry Economics.
W. Byszewski, and B. Dobrzanski.
Postepy Nauk Roln. Vol 19, No 5, p 71-89. 1972. Illus.

Descriptors: Environmental effects, Productivity, Industrial production, Industrial wastes, Plant breeding, Chemical wastes, Fertilizers.
Identifiers: Industrial productivity.

In the process of intensifying plant production the prevention of changes harmful to man in the natural environment is considered. Further studies are recommended on the influence on the environment of such measures as chemical fertilization and plant protection measures, mechanization of plant production, plant breeding, water regulation and plant production systems.--Copyright 1974, Biological Abstracts, Inc.
W76-00766

BIODEGRADATION OF AQUATIC POLLUTANTS,
Rhode Island Univ., Kingston. Dept. of Microbiology.
C. W. Houston.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-246 273, $3.75 in paper copy, $2.25 in microfiche. Completion Report, (1975). 36 p, 11 fig, 9 tab, 7 ref. OWRT A-050-RI(1). 14-31-0001-5040.

Descriptors: Pesticides, *Biodegradation, *Metabolism, *Herbicides, Pseudomonas, 2-4-D, 2-4-5-T, Organic pesticides, Organic acids, *Pesticide residues, *Pollutant identification.
Identifiers: Co-metabolism.

Organisms isolated from commercial turf farm soil and identified as species of the genus, Pseudomonas, were used to study the utilization of three phenoxy herbicides. 2,4-dichlorophenoxyacetic acid (2,4-D) was readily attacked in a mineral salts medium. 2,4,5-trichlorophenoxyacetic acid (2,4,5-T) and 2-(2,4,5-trichlorophenyxy)-propionic acid (2,4,5-TP) were attacked only in the presence of a growth substrate such as sodium benzoate. Cell yield on benzoate with the latter two compounds did not differ, suggesting a co-metabolic attack. Small quantities of peptone and/or beef extract had little effect on cell yield but markedly increased herbicide utilization. The observed recalcitrance of at least some organics may be attributed to stringent enrichment isolation procedures which do not allow isolation of actively degrading organisms. Similarly, persistence in the environment may be due, in part at least, to the slow attack in the absence of the stimulatory effect of soluble organic compounds, which are of a transient nature in soil and water.
W76-00821

SOIL PHOSPHORUS AVAILABILITY AS MEASURED BY DISPLACED SOIL SOLUTIONS, CALCIUM-CHLORIDE EXTRACTS, DII UTE-ACID EXTRACTS, AND LABILE PHOSPHORUS,
Colorado State Univ., Fort Collins. Dept. of Agronomy; and Colorado State Univ., Fort Collins. Dept. of Soil Sciences.
For primary bibliographic entry see Field 3C.
W76-00825

A TWO-PHASE MODEL FOR THE MISCIBLE DISPLACEMENT OF REACTIVE SOLUTES IN SOILS,
Arizona Univ., Tucson. Dept. of Soils, Water and Engineering.
For primary bibliographic entry see Field 3C.
W76-00826

LAND SURFACE EROSION AND RAINFALL AS SOURCES OF STRONTIUM-90 IN STREAMS,
Agricultural Research Service, Durant, Okla. Quality Management Lab.
R. G. Menzel.

Journal of Environmental Quality, Vol 3, No 3, p 219-223, July-September, 1974. 4 fig, 2 tab, 23 ref.

Descriptors: *Runoff, *Erosion, Strontium, *Streams, Water quality, Radioactivity, Pesticides, Correlation analysis.
Identifiers: Strontium-90.

Strontium-90 concentrations in streams from 1958 to 1967 reflected the changing concentrations in rainfall and accumulation on the land surface. Correlation analysis of data from nationwide sampling networks shows that the Sr-90 concentration in streams was accounted for, on the average, by 1.7% of the rainout 2 months earlier, and annual erosion of 0.58% of the accumulated Sr-90 on the land surface. Direct runoff of Sr-90 in preceding rainfall was highest, 2.0 to 2.2%, in the north central and eastern United States, ranging down to no measurable direct runoff in the southwestern United States. Annual erosion of Sr-90 from the land surface ranged from 0.75% in the Ohio River Basin to 0.17% in the Missouri River Basin. If one allows for differences in time and area of application, these results for land surface erosion indicate the potential movement of persistent, strongly adsorbed pesticides from large land areas. (Skogerboe-Colorado State)
W76-00830

COMPUTER MODELING OF NITROGEN TRANSFORMATIONS IN SOILS,
California Univ., Davis. Dept. of Water Science and Engineering.
For primary bibliographic entry see Field 2G.
W76-00831

NITRATE OCCURRENCE IN SOME SOILS WITH AND WITHOUT NATRIC HORIZONS,
Illinois Univ., Urbana. Dept. of Agronomy.
For primary bibliographic entry see Field 2G.
W76-00836

EFFECTS OF SALMON CANNERY WASTES ON WATER QUALITY AND MARINE ORGANISMS,
Washington Univ., Seattle. Fisheries Research Inst.
For primary bibliographic entry see Field 5C.
W76-00861

TOXIC, SUBLETHAL, AND LATENT EFFECTS OF PETROLEUM ON RED SEA MACROFAUNA,
National Marine Water Quality Lab., Kensington, R. I.
For primary bibliographic entry see Field 5C.
W76-00862

THE EFFECT AND FATE OF CRUDE OIL SPILT ON TWO ARCTIC LAKES,
Fisheries Research Board of Canada, Winnipeg (Manitaba). Freshwater Inst.
For primary bibliographic entry see Field 5C.
W76-00863

CONTROLLED FOOD-CHAIN TRANSFER OF DIELDRIN RESIDUES FROM PHYTOPLANKTERS TO CLAMS,
Texas A and M Univ., College Station. Dept. of Biology.
S. R. Petrocelli, J. W. Anderson, and A. R. Hanks.
Marine Biology, Vol 31, No 3, p 215-218, 1975. 1 fig, 27 ref.

Descriptors: *Phytoplankton, *Molluscs, *Primary productivity, *Food chains, *Dieldrin, *Clams, Laboratory tests, Halogenated pesticides, Path of pollutants, Adsorption, *Pesticide residues, Water pollution effects.
Identifiers: Dunaliella peircei, Rangia cuneata, Tissue analysis, Bioaccumulation, Sublethal concentrations.

The marine phytoplankter Dunaliella peircei was exposed to a concentration of 10.00 micrograms/liter of the chlorinated hydrocarbon insecticide dieldrin in sea-water solution. After 24 hour exposure, the dieldrin residue level in the alga was 12.10 microgram/gram, corresponding to a magnification factor of 1210. Clams, Rangia cuneata, allowed to feed on dieldrin-contaminated phytoplankters for 48 hours exhibited a magnification of dieldrin residues in tissues up to 54 times greater than the concentration resulting from the resuspension of contaminated algal cells in clean seawater. This study demonstrated the transfer of dieldrin residues in a two-level food chain, i.e., from a contaminated alga to a bivalved molluscs allowed to feed on this alga. (KLein)
W76-00867

SEAGRASSES OF SOUTH-WESTERN AUSTRALIA WITH SPECIAL REFERENCE TO THE ECOLOGY OF POSIDONIA AUSTRALIS HOOK F. IN A POLLUTED ENVIRONMENT,
Western Australia Univ., Nedlands. Dept. of Botany.
For primary bibliographic entry see Field 5C.
W76-00870

BACTERIOLOGICAL STUDIES OF WICOMICO RIVER SOFT-SHELL CLAM (MYA ARENARIA) MORTALITIES,
Maryland Univ., College Park. Dept. of Microbiology.
For primary bibliographic entry see Field 5C.
W76-00873

CAUSES OF DECREASE AND DISAPPEARANCE OF THE SEAGRASS POSIDONIA OCEANICA ON THE FRENCH MEDITERRANEAN COAST (CAUSES DE LA RAREFACTION ET DE LA DISPARATION DES HERBIERS DE POSIDONIA OCEANICA SUR LES COTES FRANCAISES DE LA MEDITERRANEE),
Centre d'Oceanographie, Marseille (France). Station Marine d'Endoume.
J. M. Peres, and J. Picard.
Aquatic Botany, Vol 1, No 2, p 133-139, June 1975, 5 ref.

Descriptors: *Grasses, *Water pollution sources, *Sewage, *Sediments, Clay, Ecosystems, Environmental effects, Vegetation effects, Soil erosion, Water pollution effects.
Identifiers: *Posidonia oceanica, Gulf of Marseilles(France), *Seagrasses.

Two causes which also represented two stages of the decrease of the seagrass, Posidonia oceanica, were observed in the Gulf of Marseilles. The first cause was determined to be the increase in the level of global pollution, mostly sewage which increased the turbidity of seawater through eutrophication and induced the compensation depth to decrease by 5-8 meters, causing the deepest parts of the beds to disappear. The second cause was related to the increase of clay sedimentation which arose from harnessing the Rhine River. Ecological effects were discussed in relation to the disappearance of Posidonia beds and the existing ecosystems. (KLEIN)
W76-00876

ASSESSING A MARSH ENVIRONMENT FOR WASTEWATER RENOVATION,
Agricultural Research Center, Fort Lauderdale, Fla.
For primary bibliographic entry see Field 5D.
W76-00892

LAND DISPOSAL OF EFFLUENT FROM A SANITARY LANDFILL,
Florida Univ., Gainesville. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 5E.
W76-00893

DILUTION AND DECAY OF AQUATIC HERBICIDES IN FLOWING CHANNELS,
Commonwealth Scientific and Industrial Research Organization, Griffith (Australia). Div. of Irrigation Research.
E. M. O'Loughlin, and K. H. Bowmer.
Journal of Hydrology, Vol. 26, No. 3/4, p 217-235, August 1975. 7 fig, 1 tab, 9 ref, 1 append.

Descriptors: *Path of pollutants, *Herbicides, *Aquatic weed control, *Diffusion, *Dispersion, *Australia, *Tracers, Chemical degradation, Flow, Movement, Analytical techniques, Path of pollutants, Aquatic weeds, Irrigation canals, Open channel flow, Model studies.
Identifiers: *Concentration-time curves, Acrolein.

The behavior of herbicides injected into flowing irrigation channels for aquatic weed control was analyzed. Solutions to the one-dimensional convective-diffusion equation were given for instantaneous and step-function injections of a decaying tracer. The basic solutions were used to derive methods for determining the degradation rate from field experiments, and the total exposure to the herbicide as the water flows over the weeds. It was shown that some significant aspects of herbicide behavior are unaffected by dispersion, and depend only on the degradation rate constant and the travel time of the material. Observations from trials in irrigation channels in the U.S. and Australia with the herbicide acrolein were analyzed. The herbicide application rates and computed exposures varied greatly. Degradation rate constants were more nearly equal. (Lardner-ISWS)
W76-00895

OCCURRENCE AND DISTRIBUTION OF POTASSIUM IONS IN NATURAL WATERS IN INDIA,
Soil Research Lab., Chandigarh (India).
B. K. Handa.
Journal of Hydrology, Vol. 26, No. 3/4, p 267-276, August 1975. 9 fig, 1 tab, 20 ref.

Descriptors: *Surface waters, *Rain water, *Groundwater, *Potassium, *Distribution patterns, Sodium, *Ions, Chemical analysis, Frequency curves, Rivers, Sampling, Analysis, Water analysis, Investigations, Weathering, Water pollution sources, *Path of pollutants.
Identifiers: *India, Natural waters, K/Na ratio.

A systematic study of the distribution of K ions in rainwaters over India gave a mean value of 0.46 mg/l, with values ranging from 0.1 to 2.3 mg/l (n = 130). Rainwater samples were taken in an industrial area near Calcutta, in a more remote area 350 km away, and in other inland towns. In the case of river waters, the mean value obtained was 3.39 mg/l (n = 676), the range being 1 to 13 mg/l. All major Indian rivers were sampled, with weathering, rainfall and agricultural runoff being the major source of K ions. Groundwater samples were taken in areas of differing geological formation. Groundwaters had a mean value of 8.2 mg/l (n = 3067), the K ion concentration ranging between 1 and 80 mg/l. When the chemical composition of the natural waters was plotted on the equilibrium diagrams for silicate minerals at 25C and 1 atm. pressure, it was found that most waters plot in the kaolinite stability field. However, a few rainwater samples plotted in the stability field of gibbsite. (Lardner-ISWS)
W76-00897

CHLORIDE CONTAMINATION IN ALUM CREEK, CENTRAL OHIO.
Ohio State Univ., Columbus. Dept. of Geology and Mineralogy.
W. A. Pettyjohn.
Ground Water, Vol. 13, No. 4, p 332-339, July-August 1975. 8 fig, 7 ref.

Descriptors: *Water pollution, *Chlorides, *Brines, *Ohio, Brine disposal, Oil wells, Oil fields, Injection wells, Wastes, Pollutants, Surface waters, Groundwater, Water pollution sources, *Path of pollutants, Seepage, Soil contamination, Water quality, Taste, Discharge(Water), Sampling, Water analysis.
Identifiers: *Alum Creek(Ohio).

Periodically, Alum Creek at the Westerville water treatment plant contains excessive concentrations of chloride, producing a salty taste. The chloride is not removed during the water treatment process. Uncontaminated surface water and groundwater throughout Alum Creek basin contain less than 25 mg/l of chloride. Larger concentrations are related to man's activity in the basin, particularly oil production. The chloride content in samples of contaminated surface water ranged from 26 to nearly 28,000 mg/l, while samples from oil-field brine pits ranged between 3,000 and 57,000 mg/l. Even a brief examination of the data indicates that most of the chloride contamination in Alum Creek is due to: (1) the discharge of oil-field brines directly into the mainstem or its tributaries in the upper reaches of the basin, or (2) the discharge of contaminated groundwater into streams. In many areas, the highly mineralized groundwater that is now seeping into the streams may have been contaminated a decade ago. (Sims - ISWS)
W76-00910

IN SITU SOIL GAMMA ANALYZER--A NEW APPROACH TO DETERMINE THE MOVEMENT OF POLLUTANTS IN SOILS.
National Environmental Research Center, Las Vegas, Nev.
For primary bibliographic entry see Field 5A.
W76-00912

PLANNING LAND APPLICATION OF MANURE,
Wisconsin Univ., Madison.
L. R. Massie.
In: Proceedings of Conferences on Farm Animal Wastes, Nitrates and Phosphates in Rural Wisconsin Ecosystems, Madison, Green Bay, and Eau Claire, Wisconsin, Feb. 1-5, 1971, p.215-222. 6 tab, 2 ref.

Descriptors: *Planning, Agricultural runoff, Surface waters, Soils, Pollutants, Water pollution sources, Fertilizers, *Farm wastes.
Identifiers: Land disposal, Manure.

The development of a system for land application of manure must consider land forms, surface runoff, and present or possible land use if organic pollution is to be kept to a minimum. Livestock producers now need to consider some additional dimensions when planning application of manure to their land. They must be concerned with movement of nutrients from their fields via the primary carrier, i.e., surface runoff water. Some soil conditions which may cause problems are internal drainage, slow water intake (infiltration) rates, rooting restrictions or shallow soils, erosion, and the location of the soil body on the landscape. A list of suggested practices for the application of manure to the land is given. Application of these practices will further the conservation effort for erosion control. Changes will be needed as additional information from research and experience become available. (Cameron-East Central)
W76-00913

SOCIAL, LEGAL, AND ECONOMIC CONSIDERATIONS OF ANIMAL PRODUCTION IN URBANIZED AREAS,
For primary bibliographic entry see Field 5D.
W76-00916

ODOR INTENSITIES AT CATTLE FEEDLOTS,
Texas Agricultural Extension Service, College Station.
For primary bibliographic entry see Field 5A.
W76-00919

NUCLEAR SHIP POLLUTION: NATIONAL AND INTERNATIONAL REGULATION AND LIABILITY,
For primary bibliographic entry see Field 6E.
W76-00921

UNION OIL CO. V OPPEN: RECOVERY OF A PURELY ECONOMIC LOSS IN NEGLIGENCE (NOTE ON CASE ARISING FROM OIL SPILL).
For primary bibliographic entry see Field 6E.
W76-00924

THE BOUNDARY WATERS TREATY OF 1909: DOES IT PROVIDE AN ENVIRONMENTAL CAUSE OF ACTION,
For primary bibliographic entry see Field 6E.
W76-00926

NO DUMPING IN THIS OCEAN: NEARING THE END OF SHIP-GENERATED POLLUTION,
S. I. Kern.
Journal of International Law and Politics, Vol 7, No 3, p 545-573, 1974. 185 ref.

Descriptors: *Water pollution, *International law, *Ships, *Legal aspects, International waters, Governmental interrelations, Oil pollution, Pollutants, Water pollution sources, Water pollution control, Water quality, Wastes, Abatement, Governments, Standards.
Identifiers: *1973 International Convention for the Prevention of Pollution from Ships.

The 1973 International Convention for the Prevention of Pollution from Ships is discussed. The 1973 Covention recognizes the serious consequences of the deliberate, negligent and accidental release of oil and other harmful substances and calls for the elimination of intentional pollution of the marine environment and the minimization of accidental discharges of pollutants. The 1973 Convention represents the first international effort to regulate pollution by noxious substances other than oil and to establish equipment, construction and safety standards designed to minimize the risks of accidental and the desirability of intentional discharge. The 1973 Convention also toughens restrictions on oil discharge and provides for more stringent enforcement. The 1973 Convention applies to ships entitled to fly the flag of a party to the Convention or which operates under the authority of a party. Although the 1973 Convention may bring about a considerable reduction in the discharge of pollutants from ships, economic and technological factors have prevented the imposition of regulations that would totally eliminate vessel-generated pollution. (Nursey-Florida)
W76-00930

TERRITORIAL SOVEREIGNTY AND THE PROBLEM OF TRANSNATIONAL POLLUTION,
For primary bibliographic entry see Field 6E.
W76-00934

UNITED STATES V GAF CORPORATION (ACTION FOR INJUNCTIVE RELIEF FROM DISPOSAL OF ORGANIC WASTES BY DEEP WELL INJECTION).
389 F Supp 1379-1388 (S D Tex 1975). 10 p.

Descriptors: *Texas, *Judicial decisions, *Federal Water Pollution Control Act, *Injection wells, *Waste disposal wells, Permits, Federal jurisdiction, Federal government, Environmental effects, Legislation, Penalties(Legal), Water law, Water pollution, Water pollution control, Water pollution sources.
Identifiers: Injunctive relief, FWPCA Amendments of 1972, Liability(Legal aspects), Effluent discharges, Administration regulations.

Plaintiff federal government sued defendant corporation to enjoin deep-well injection of organic chemical waste, without the approval of the Environmental Protection Agency. Jurisdiction was sought under Section 1319 of the Federal Water Pollution Control Act (FWPCA) which authorizes a civil action to be brought against anyone who discharges a pollutant in contravention of Section 1311. The district court held that the FWPCA does not apply to subsurface wells. The court reasoned that the failure of an amendment to the Act which would have included such activity compelled such a conclusion. The court further held that even if deep-well injection was covered by the Act, there were no effluent limitations established. Thus, defendant's actions would not be violative of the Act. Defendant's motion to dismiss was granted because plaintiff's complaint failed to show a violation of the anti-pollution provisions of the Act. (Jenkins-Florida)
W76-00938

SAVE OUR SOUND FISHERIES V CALLAWAY (ACTION TO ENJOIN DUMPING DREDGED SPOIL INTO NAVIGABLE OCEAN WATERS).
For primary bibliographic entry see Field 5C.
W76-00939

CARCINOGENS COMPLICATE CHLORINE QUESTION,
P. S. Ward.
Journal Water Pollution Control Federation, Vol 46, No 12, p 2638-2640, Dec 1974, 1 tab.

Descriptors: *Louisiana, *Chlorination, *Water quality control, *Public health, *Chlorine, Water purification, Water pollution, Diseases, Potable water, Disinfection, Domestic water, Water quality standards, Water policy, Water pollution effects.
Identifiers: *Cancer, *Studies, *Harmful compounds.

An estimated 1,000 tons of chlorinated organic compounds, some of them known to induce cancer in lab animals, are discharged annually into the nation's waterways as a result of the chlorination of waste water. As a result of this discharge a new problem has been uncovered: the problem of human health effects. The Environmental Protection Agency (EPA) recently released a study of the New Orleans drinking water supply, which indicated the presence of small quantities of sixty-six organic chemicals, many of them chlorinated hydrocarbons. This announcement was issued shortly after a private study indicated the existence of a significant statistical relationship between drinking New Orleans public water and the incidence of cancer in white males in the area. As a result of this study, an EPA study has begun to determine areas in which these compounds occur and to evaluate the health significance of the compounds at the levels found in the waters. The impact the proposed Safe Drinking Water Bill will have on the chlorine issue is explored. There is also a discussion of the alternative disinfectants which may be used in the place of chlorine to treat water. (Hoffman-Florida)
W76-00946

CHEMEHUEVI TRIBE OF INDIANS V FEDERAL POWER COMMISION (ACTION TO DETERMINE JURISDICTION OF FPC OVER THERMAL ELECTRIC POWER PLANTS LOCATED ON NAVIGABLE STREAMS).
For primary bibliographic entry see Field 6E.
W76-00947

U.S. V. WHITE FUEL CORP. (APPEAL FROM CONVICTION OF VIOLATION OF REFUSE ACT).
498F.2d 619 (1st Cir 1974).

Descriptors: *Massachusetts, *Judicial decisions, *Rivers and Harbors Act, *Oil pollution, *Seepage, Water law, Legal review, Legal aspects, Water pollution control, Water pollution, Water pollution sources, Negligence, Adjudication procedure, Law enforcement, Federal government, Legislation, Navigable waters, Land tenure, Oil spills, Oily water, Percolation, Underseepage.
Identifiers: *Absolute liability, *Liability(Legal aspects), *Refuse Act of 1899.

Appellant corporation, an oil tank farm operator, was convicted in federal district court of violating section 13 of the Rivers and Harbors Act of 1899. The conviction was the result of oil seepage from underground deposits on appellant's property into the navigable waters of Boston Harbor. The appellant contended that the government was required to prove scienter or at least negligence on the part of the appellant, and that the lower court erred by precluding the appellant's defense of due care. The federal government contended that evidence at trial of improper booming by the appellant in its attempts to confine the seepage was sufficient to support the conviction. The First Circuit Court of Appeals affirmed and held that the evidence of improper booming was not sufficient to support conviction, but the absence of any proof that a third party was responsible for the leakage was enough to sustain the lower court's holding. (Deckert-Florida)
W76-00948

ATLAS CHEMICAL INDUSTRIES, INC. V. ANDERSON (ACTION FOR DAMAGES FROM DISCHARGE OF POLLUTANTS INTO CREEK CROSSING PLAINTIFF'S LANDS).
For primary bibliographic entry see Field 6E.
W76-00950

CITY OF WAUKENGAN V. POLLUTION CONTROL BOARD (APPEAL FROM PROCEEDING ASSESSING FINES AGAINST CITIES AND CORPORATION).
311 N.E.2d 146 (Ill 1974).

Descriptors: *Waste disposal, *Law enforcement, *Penalties, *Jurisdiction, Judicial decisions, Industrial wastes, Municipal wastes, Sewage Waste treatment, Pollution abatement, Legislation, Illinois, Legal aspects, Water law.
Identifiers: *Separation of powers.

Appeal was taken from an action of the State Pollution Control Board assessing fines against the city and corporation for operating a refuse disposal site without obtaining a permit from the Environmental Protection Agency. Appellant contended that the authority given the Board to impose monetary penalties was a relegation of judicial power in violation of the separation of powers provision of the Constitution of Illinois and the United States Constitution relying on interpretation of the separation of powers provision by the United States Supreme Court and the Supreme Court of Illinois approving delegations of authority to impose civil penalties. The court held the authority granted to the State Board did not violate constitutional mandates. (Proctor-Florida)
W76-00954

LEGAL MEASURES CONCERNING MARINE POLLUTION.
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00963

POLLUTION OF THE HIGH SEAS: THE OCEANS AS INTERNATIONAL RIVERS,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00964

MARINE POLLUTION CONTROL AND MAN-MADE ISLANDS,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6G.
W76-00966

INTERNATIONAL OCEAN DUMPING OF INDUSTRIAL CHEMICAL WASTE,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00968

THE QUEST FOR OIL: A DECISIVE FORCE IN THE LAW OF THE ARCTIC SEA PERTAINING TO POLLUTION,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00969

FLUORIDE POLLUTION,
National Research Council, Washington, D. C.
For primary bibliographic entry see Field 5C.
W76-00975

GARDINIER, INC. V. FLA. DEPT. OF POLLUTION CONTROL (PETITION FOR WRIT OF CERTIORARI TO DETERMINE THE VALIDITY OF AN ORDER OF THE DEPARTMENT OF POLLUTION CONTROL).
300 So. 2d 75 (Fla App 1974).

Descriptors: *Water pollution, *Water pollution sources, *Water quality control, *Judicial decisions, Florida, Bays, Fertilizers, Industrial wastes, Water quality standards, Environmental engineering, Water law, Water resources development.
Identifiers: *State agencies, *Water pollution statement.

Writ of Certiorari was granted by the District Court of Appeal to consider the question of the Florida Department of Pollution Control's authority to require as a condition to the extension of a temporary operating permit the posting of a bond which is absolutely forfeitable in the event of failure to strictly adhere to the compliance schedule. The court held that while it would have been permissible to require a bond against which the Department could execute following a judicial determination of an appropriate penalty for failure to abide by the schedule, the absolute forfeiture provisions were beyond the statutory authority of the Department. (Proctor-Florida)
W76-00982

MARINE TOWING, INC. V. RED STAR TOWING AND TRANSPORTATION CO. (ACTION FOR DAMAGES SUFFERED WHEN TUG STRUCK A WRECK IN NAVIGABLE WATERS).
For primary bibliographic entry see Field 6E.
W76-00983

TANKERS AND THE MARINE ENVIRONMENT, PART I.
Hearings--National Ocean Policy Study, Committee on Commerce, U. S. Senate, 94th Congress, 1st Session, January 29, 30, 1975, 146 p.

Descriptors: *Oil spills, *International waters, *Ships, *Navigation, *Coast Guard regulations, *Safety factors, Environmental effects, Drilling, Port authorities, Pacific coast region, Straits, Navigable waters, United States, Pollution, Marine animals, Oil pollution, International law, Alaska, California, Construction, Dispersion, Operation and maintenance, Oil.
Identifiers: *Liability, *Grounding, *Oil tankers, *Very large crude carriers(VLCC's), Hearings, Supertankers, Puget Sound, Philadelphia, Navigation aids, Deepwater ports, Double bottom tankers, Air deliverable antipollution transfer system(ADAPTS), Ports and Waterways Safety Act.

These Senate Hearings concern Coast Guard supervision of oil tankers entering U.S. waters under the Ports and Waterways Safety Act of 1972. With more and bigger oil tankers seeking to supply industralized nations, the threat of disastrous oil spills has vastly increased. Some of the new very large crude carriers (VLCC's) exceed 500,000 deadweight tons and have 90 feet drafts. An examination of recent oil spills around the globe reveals new problems in navigation, caused by the tankers' huge size, and of international control, since many of the tankers are registered in countries that merely sell them a flag to sail under. Liberia alone has registered approximately 40 per cent of the world's operational tankers. The Senate Committee is concerned with insuring that these tankers comply with American safety and liability regulations, as well as with developing new ways of minimizing the possibility of oil spillage. Construction of deepwater off-loading facilities and antipollution emergency control systems are either underway or in planning stages. Addenda to the Hearings include articles on supertanker construction, operations and groundings worldwide. (Parrish-Florida)
W76-00985

MAJOR FLOODS, POOR LAND USE DELAY RETURN OF SEDIMENTATION TO NORMAL RATES,
Forest Service (USDA), Berkely, Calif. Pacific Southwest Forest and Range Experiment Station.
For primary bibliographic entry see Field 4D.
W76-00989

THE VARIATION OF DISSOLVED CONSTITUENTS WITH DISCHARGE IN SOME NORFOLK RIVERS,
Yorkshire River Authority, Leeds (England) Pollution Prevention Dept.
A. M. C. Edwards.
J Hydrol (Amst), Vol 18, No 3/4, p 219-242, 1973, Illus.

Descriptors: *Dissolved solids, Path of pollutants, Nitrates, Sulfates, Phosphates, Carbonates, Rivers, England, Leaching.

Weekly samples were collected during 1970 from the rivers Yare, Tud, Tas and Wensum in Norfolk (England) and analyzed for dissolved Na, K, Ca, Mg, Si, Cl, bicarbonate, nitrate, phosphate and sulfate. The relationship between the concentration and discharge was examined by regression analysis. Mg, bicarbonate and, for the Yare and Wensum, P were diluted by increases in discharge. Nitrate and sulfate concentrations were positively correlated with discharge, possibly due to these constituents being derived from the leaching of the upper part of the soil profile. K concentration increased at the beginning of most storm hydrographs but, like Na, was diluted in other occasions. Large increases in nitrate, sulfate, K, Na, Cl and Si occurred in Nov., with accumulated weathered products being flushed from the soil, as the summer moisture deficit was replenished, Si was insensitive to changes in discharge during the 1st months of 1970. During the spring and summer it was depleted by diatoms. Calcium concentration was also uncorrelated with discharge, possibly due to being derived from the solution of caldium carbonates and calcium sulfate. The rivers were supersaturated calcium carbonate, when compared with the solubility product of calcite and showed no signs of equilibrating.--Copyright 1974, Biological Abstracts, Inc.
W76-00991

DISSOLVED LOAD AND TENTATIVE SOLUTE BUDGETS OF SOME NORFOLK CATCHMENTS,
Yorkshire River Authority, Leeds (England). Pollution Prevention Dept.
A. M. C. Edwards.
J drol (Amst), Vol 18, No 3/4, p 201-217, 1973, Illus.

Descriptors: *Dissolved solids, Path of pollutants, Nitrates, Sulfates, Phosphates, Rivers, England, Sewage effluents, Leaching.

Weekly water samples were collected during 1970 from the rivers Yare, Tud and Wensum in Norfolk (England). The relationships between discharge and the variations in the dissolved load of Na, K, Ca, Mg, Si, Cl, bicarbonate, nitrate, phosphate and sulfate were examined by regression analysis. The correlation coefficients were all highly significant and the slopes of the regression equations in most cases approximated to plus 1. The slope coeffiecients for nitrate and sulfate were greater than plus 1, as their concentration increased with discharge. Most of the phosphate in the Yare and Wensum was derived from sewage effluent, which was diluted by high flows. The most effective discharges for transporting all constituents were those of winter baseflow. Only 20% of the load was removed from the catchments between May and Oct. Tentative solute budgets showed that rainfall was a significant input for K, Mg, Na, Cl and sulfate. For chloride in the Tud this amounted to 55%. Sewage contributed less than 15% of the input of the constituents except P. It was unlikely that more than 10% of the fertilizer N was lost by leaching to the rivers. Ca was derived from the solution of carbonate and sulfate minerals. The calcium carbonate erosion rate was 58.0 Mg/km2 for the Yare and 39.2 Mg/km2 for the Tud. The Sierosion rate, correct for depletion by diatoms was 1.1 Mg/km2 for the Yare and 0.77 Mg/km2 for the Tud.--Copyright 1974, Biological Abstracts, Inc.
W76-00992

PATHOLOGICAL CHANGES OBSERVED IN FISHES FOLLOWING POISONING BY GRANULATED HERBICIDES-ATRAZINE AND DIURON: RAPID DETERMINATION OF THE TOXICITY OF LOW PESTICIDE CONCENTRATIONS (IN RUSSIAN),
For primary bibliographic entry see Field 21.
W76-00995

5C. Effects Of Pollution

ENVIRONMENTAL SURVEY OF TWO INTERIM DUMPSITES-MIDDLE ATLANTIC BIGHT. SUPPLEMENTAL REPORT.
For primary bibliographic entry see Field 5E.
W76-00511

THE USE OF A PELAGIC TROPHODYNAMIC CHAIN FOR STUDYING THE TRANSFER OF METALLIC POLLUTANTS, (IN FRENCH),
Centre dEtudes et de Recherches de Biologie et d'Oceanographie Medicale, Nice (France).
For primary bibliographic entry see Field 5B.
W76-00577

A PROBLEM IN THE USE OF INSECTICIDES IN PADDY FIELDS IN WEST MALAYSIA: A CASE STUDY,
Ministry of Agriculture and Lands, Kuala Lumpur (Malaysia). Div. of Agriculture.
For primary bibliographic entry see Field 5B.
W76-00581

PHYTOPLANKTON AND EUTROPHICATION IN SOME LAKES IN VESTFOLD, SOUTH NORWAY,
Oslo Univ. (Norway). Inst. of Marine Biology; and Oslo Univ. (Norway). Dept. of Limnology.
K. A. Okland.
Blyttia, Vol 31, No 2/3, p 175-187, 1973, Illus, English summary.

Descriptors: *Lakes, *Eutrophication, *Phytoplankton, Europe, Aquatic plants, Plankton, Lake stages.
Identifiers: Anabaena-spp, Microcystis-aeruginosa, Norway, Vestfold.

The formerly mesotrophic lakes have lately become eutrophic with mass development of Anabaena spp. and Microcystis aeruginosa. The long and severe winter of 1969-70 mobilized nutrients from the bottom sediments. The hot summer of 1970 contributed to the rich algae development.--Copyright 1974, Biological Abstracts, Inc.
W76-00613

GREEN BAY SELF-PURIFIES ALGAL NUTRIENTS,
Wisconsin Univ., Madison.
G. P. Fitzgerald, M. S. Torrey, and G. C. Gerloff.
Water and Sewage Works, Vol 122, No 6, p 58-61, June, 1975. 2 fig, 4 tab, 15 ref.

Descriptors: *Algae, *Algal control, *Municipal wastes, *Lake Michigan, *Cladophora, *Nutrient removal, *Phosphorus, Industrial wastes, Drainage, Water purification, Tertiary treatment, Lakes, Water pollution effects.
Identifiers: Green Bay(Wis), Fox River(Wis), Algal nutrients.

The effects of industrial and municipal waste loadings on the nutrition of the algae along the Fox River at Green Bay, Lake Michigan, were studied. Tests of nutrient concentration in algal samples are used to evaluate the fate of pollutants in aquatic environments. It was proposed that significant reduction of the algal nutrients might be achieved if the removal of phosphorus from their effluents is implemented by major cities in the Great Lakes drainage basin. Sources of nutrients to Green Bay, water flow patterns, phosphorus, nitrogen, and iron concentrations, and bioassays of Cladophora populations were determined. A direct linear relationship was found between concentration of PO4-P and growth of algae in control cultures; addition of nitrogen and/or iron increased growth signficantly. The growth of algae in Lake Michigan seems generally to be limited by available phosphorus during the algal growing season. In early winter, Green Bay, which uses tertiary treatment of municipal and industrial wastes, is effectively self-purified, and does not supply Lake Michigan with major quantities of algal nutrients. It was recommended that other Great Lake areas apply similar phosphorus removal and self-purification practices. (Kramer-FIRL)
W76-00615

MAN'S ACCELERATION OF HYDROGEOCHEMICAL CYCLING OF PHOSPHORUS: EUTROPHICATION OF INLAND AND COASTAL WATERS,
Eidgenoessische Technische Hochschule, Zurich (Switzerland).
W. Stumm.
Water Pollution Control, Vol 74, No 2, p 124-133, 1975. 7 fig, 2 tab, 14 ref.

Descriptors: *Cycling nutrients, *Eutrophication, *Phosphorus, *Lakes, Ecosystems, Environmental effects, Hydrogeology.
Identifiers: Nutrient loading, Lake restoration.

Human activities disturb the natural balance between hydrogeochemical cycles (phosphorus, carbon, nitrogen) in the ecosystem. Pollution results from this disturbance between the rate of production (photosynthesis) and destruction (respiration). This presentation discusses some relevant factors that regulate nutrient composition and productivity. An evaluation is made of the impact of civilization of terrestrial and oceanographic transformations of phosphorus. Also, simple models on phosphorus transformation are reviewed. In particular, correlations have been made between areal nutrient loading of lakes and their enrichment as a function of a specific variables such as depth, retention period, and mixing. It is hoped that an understanding of such eutrophication may help in quantifying measures for lake restoration. (Kramer-FIRL)
W76-00620

NUTRIENT EXCHANGE IN WATER-SEDIMENT INTERFACE AND ITS EFFECTS ON WATER QUALITY,
Rhode Island Univ., Kingston. Dept. of Civil and Environmental Engineering.
C. P. C. Poon.
Available from National Technical Information Service Springfield, Va 22161 as PB-246-275, $3.25 paper coyp, $2.25 in microfiche. Completion Report (1975), 13 p, 17 fig, 15 tab, 3 ref. OWRT B-052-RI(1). 14-31-0001-4123.

Descriptors: Water quality, *Pollutant identification, Chemical analysis, *Sediments, Nitrogen, *Phosphorus, Carbon, Metals, Ammonia, Kinetics, Absorption, *Rhode Island, Bays, Sediment-water interfaces, Nutrients, Iron Manganese.
Identifiers: Sediment profiles, *Narragansett Bay(R.I.), Organic carbon, Marine sediments, *Ammonia-nitrogen.

Profiles of carbon, nitrogen, phosphorus, iron and manganese of Narragansett Bay sediments were established after extensive physical and chemical analyses of samples taken at various locations in the Bay. These profiles reveal the history of pollution in the Bay. Relationships between metals and the nutrients were also established. Clear trends of increasing NH3-N and available-P concentrations in deeper layers of sediments with corresponding decrease of organic carbon were detected. Dredging of the sediment could expose these higher NH3-N and available-P concentrations to the overlying water. Microcosm study showed that the sediments could act as a source or sink of phosphorus under various conditions. The dissolved oxygen content, phosphorus concentration in water and available-P in sediment dictate the amount of P release or uptake by the sediment. In heavily polluted areas, the seawater flushing rate increases the phosphorus flux rate and vice versa. The steady state flux rate of P varies from 20 to 440 ug-P/m2/hr in Narragansett Bay depending on location and flushing rate. No NH3-N release from Narragansett Bay sediments occurs and consequently only phosphorus is considered a potential nutrient source in the sediment.
W76-00715

INCREASING INTENSIFICATION OF PLANT PRODUCTION AND THE PROBLEM OF CHANGES IN THE NATURAL ENVIRONMENT,
Polish Academy of Sciences, Warsaw. Inst. on Agricultural and Forestry Economics.
For primary bibliographic entry see Field 5B.
W76-00766

EFFECTS OF SALMON CANNERY WASTES ON WATER QUALITY AND MARINE ORGANISMS,
Washington Univ., Seattle. Fisheries Research Inst.
D. L. Beyer, R. E. Nakatani, and C. R. Staude.
Journal Water Pollution Control Federation, Vol 47, No 7, p 1857-1869, July 1975, 8 fig, 1 tab, 6 ref.

Descriptors: *Water quality, *Canneries, *Industrial wastes, Tidal effects, Salmon, Marine animals, Water pollution sources, Dissolved oxygen, Salinity, Hydrogen ion concentration, *Alaska, Water pollution effects.
Identifiers: *Petersburg(Alas).

Although cannery wastes have presented problems in some Alaskan communities, dissolved oxygen, salinity, water temperature, and pH values in waters affected by discharges near Petersburg showed no appreciable differences from control areas. Results of a survey of intertidal macrofauna indicated that these organisms were not adversely affected by the discharges. Small areas of subtidal waste accumulations and increased turbidities and biochemical oxygen demand in the immediate area of the discharges were the only problems encountered. Tests with undiluted wastes held in a closed system demonstrated that changes in pH and dissolved oxygen may reach undesirable levels in a short period of time. The effects of the discharges were minimized in the field situation, however, by the excellent flushing action of the tides, which resulted in a high dilution and dispersion of the wastes. (Klein)
W76-00861

TOXIC, SUBLETHAL, AND LATENT EFFECTS OF PETROLEUM ON RED SEA MACROFAUNA,
National Marine Water Quality Lab., Kensington, R. I.
R. Eisler.
In: 1975 Conference on Prevention and Control of Oil Pollution:Proceedings, p 535-540, March 1975; 1 fig, 7 tab, 19 ref.

Descriptors: Oil, *Water pollution sources, Aquatic animals, Ecosystems, Enivornmental effects, Growth stages, Coral, Molluscs, Crustaceans, Teleosts, Population, Water pollution effects, *Oil pollution, Dispersion, Path of pollutants, *Toxicity, *Lethal limit.
Identifiers: *Oil dispersants, *Crude oils, Octocorals, Echinoderms, Bioaccumulation, *Red Sea microfauna.

The effects of crude oils, an oil dispersant, and oil-dispersant mixtures on juvenile and adult octocorals, crustaceans, molluscs, echinoderms and teleosts from the Red Sea were investigated. Effects included reduction in feeding rate and egg case deposition of predatory gastropods, interference with substrate attachment by mussels, liver enlargement and lowered blood hematocrit values in fish, and bioaccumulation of crude oils in octocorals. The introduction of petroleum into Red Sea ecosystems was found to be potentially disruptive of established feeding-predator patterns, reproductive patterns, defence mechanisms, and stable populations. (Klein)
W76-00862

THE EFFECT AND FATE OF CRUDE OIL SPILT ON TWO ARCTIC LAKES,
Fisheries Research Board of Canada, Winnipeg (Manitaba). Freshwater Inst.
N. B. Snow, and B. F. Scott.
In: 1975 Conference on Prevention and Control of Oil Pollution:Proceedings, p 527-534, March 1975. 5 fig, 5 tab, 31 ref.

Descriptors: Oil, *Oil spills, *Lakes, Model studies, Benthos, Water quality, Environmental effects, Ecosystems, Arctic, Water pollution effects, Path of pollutants, *Oil pollution.
Identifiers: *Crude oils.

Two crude oil spills were carried out on adjacent lakes which were partitioned to obtain experimental and control areas within the same lake. Two types of crude oil were used. Concentration of study was the immediately affected littoral benthos. Comparative data on nitrogen, carbon, and seston weight values, number and distribution of organisms and diatom species colonizing on styrofoam balls, and total chloraphyll concentrations of the pre- and post-oil spill lakes were among the characteristics studied. (Klein)
W76-00863

TOXICITY OF NITRITE TO CHANNEL CATFISH,
Southern Illinois Univ., Carbondale. Fisheries Research Lab.
M. Konikoff.
The Progressive Fish-Culturist, Vol 37, No 2, p 96-98, April 1975; 1 fig, 3 tab, 13 ref.

Descriptors: *Channel catfish, *Toxicity, *Nitrites, Bioassay, Fish physiology, Fish behavior, Environmental effects, Survival, Water pollution effects.
Identifiers: Ictalurus punctatus, *Bioaccumulation, Tissue analysis.

Percent survival values for channel catfish (Ictalurus punctatus) at various nitrite concentrations were determined. The behavior of catfish exposed to lethal and sublethal nitrite concentrations was observed. Nitrite poisoned catfish died with the mouth opened, gill covers closed, pectoral and dorsal spines erected, and body musculature relaxed. The blood was a distinctive dark chocolate brown color which persisted several hours after death. (Klein)
W76-00864

BODY TEMPERATURE CHANGE OF BLUEGILL SUNFISH SUBJECTED TO THERMAL SHOCK,
Virginia Polytechnic Inst. and State Univ. Blacksburg. Dept. of Biology.
J. R. Stauffer, K. L. Dickson, A. G. Heath, G. W. Lane, and J. Cairns, Jr.
The Progressive Fish-Culturist, Vol 37, No 2, p 90-92, April 1975, 2 tab, 5 ref.

Descriptors: *Fish physiology, *Heated water, *Sunfishes, *Powerplants, Effluents, *Temperature, Cooling water, Environmental effects, *Thermal pollution, Water pollution effects.
Identifiers: Heating rates, Fish body thickness.

The lack of significant correlation between length, weight, and condition factors, and time to reach equilibrium with environmental temperature suggested that heating rates were not solely dependent upon the weight or body thickness of bluegill sunfish. Blood flow rate was determining to be an important factor in determing heat exchange. The sunfish required more time to reach equilibrium when exposed to lower temperatures than when exposed to higher temperatures. (Klein)
W76-00865

EFFECT OF ZINC ON THE SETTLEMENT OF THE OYSTER CRASSOSTREA GIGAS,
Imperial Coll. of Science and Technology London (England). Applied Geochemistry Research Group.
C. R. Boyden, H. Watling, and I. Thornton.
Marine Biology, Vol 37, No 3, p 227-234, 1975, 5 fig, 5 tab, 9 ref.

Descriptors: *Oysters, *Molluscs, *Growth stages, *Heavy metals, *Zinc, Environmental effects, Animal physiology, Larvae, Behavior, Water quality, Resistance, Water pollution effects, Lethal limit.
Identifiers: Crassostrea gigas, Bioaccumulation, Sublethal concentrations.

The influence of zinc upon the pattern and success of settlement was examined in the oyster Crassostrea gigas. Late larvae were more tolerant of zinc than embryos. A delay in settlement was recorded in treatments containing zinc as low as 125 micrograms/liter, and numbers of larvae settling was reduced in the presence of zinc. Larvae subjected to zinc immediately prior to settlement showed evidence of slowing in behavioral development. Thos larvae which settled in the presence of zinc, however, when ongrown in clean water were as viable as controls. Zinc at concentrations of 250 and 500 micrograms/liter suppressed spat growth, but recovery was rapid upon subsequent on-growing in clean water conditions. (Klein)
W76-00866

CONTROLLED FOOD-CHAIN TRANSFER OF DIELDRIN RESIDUES FROM PHYTOPLANKTERS TO CLAMS,
Texas A and M Univ., College Station. Dept. of Biology.
For primary bibliographic entry see Field 5B.
W76-00867

INDUCTION OF ARYL HYDROCARBON (BENZO (ALPHA) PYRENE) HYDROXYLASE IN FISH BY PETROLEUM,
Fisheries Research Board of Canada, St. John's (Newfoundland). Biological Station.
J. F. Payne, and W. R. Penrose.
Bulletin of Environmental Contamination and Toxiclogy, Vol 14, No 1, p 112-116, July 1975, 2 tab, 12 ref.

Descriptors: *Salmonids, *Trout, *Fish physiology, *Oil pollution, *Organic compounds, *Enzymes, Water quality, Environmental effects, Toxicity, Biochemistry, Water pollution effects.
Identifiers: *Brown Trout, *Capelin, Mallotus villosus, *Aryl hydrocarbon hydroxylases, Gills, Liver, Enzyme activity, Tissue analysis, Bioaccumulation.

In both Brown trout (Salmo trutta) and capelin (Mallotus villosus), significant increases in the sepcific activity of liver aryl hydrocarbon hydroxylases (AHH) were observed within 17 days after treatment with crude oil. Activity in the gills from treated fish differed from the controls. There was no noticeable difference in mortality or behavior between treated and control fish. Specific activities of liver AHH of trout from clean and polluted lakes were significantly different, indicating that environmental factors were reflected in the enyzme levels. (Klein)
W76-00868

DISSOLVED OXYGEN DEPLETION IN STATIC BIOASSAY SYSTEMS,
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. fo Fisheries and Wildlife Sciences.
For primary bibliographic entry see Field 5A.
W76-00869

SEAGRASSES OF SOUTH-WESTERN AUSTRALIA WITH SPECIAL REFERENCE TO THE ECOLOGY OF POSIDONIA AUSTRALIS HOOK F. IN A POLLUTED ENVIRONMENT,
Western Australia Univ., Nedlands. Dept. of Botany.
M. L. Cambridge.
Aquatic Biology, Vol 1, No 2, p 149-161, June 1975, 3 fig, 7 ref.

Descriptors: *Grasses, Ecology, *Coasts, *Soils, Sampling, Growth stages, Life cycles, Industrial wastes, Seasonal, Data collections, *Australia, Soil types.
Identifiers: *Seagrasses, *Posidonia australis, Zostera mucronata, Heterozostera tasmanica, Posidonia ostenfeldii, Syringodium isoetifolium, Thalassodendron pachyrhizum, Amphibolis antarctica, Amphibolis griffithii, Halophila ovalis, South-Western Australia, Cockburn Sound(Australia).

New ecological data, including soil types, growth patterns, seasonal changes, and reactions to pollu-

tion are given for the nine species of seagrasses of south-western Australia, with special references to Posidonia australis in Cockburn Sound, a polluted marine environment. (Klein)
W76-00870

MERCURY IN FISH IN THE DERWENT ESTUARY, TASMANIA, AND ITS RELATION TO THE POSITION OF THE FISH IN THE FOOD CHAIN,
Commonwealth Scientific and Industrial Research Organization, Hobart Australia. Tasmanian regional.
For primary bibliographic entry see Field 5A.
W76-00871

BACTERIOLOGICAL STUDIES OF WICOMICO RIVER SOFT-SHELL CLAM (MYA ARENARIA) MORTALITIES,
Maryland Univ., College Park. Dept. of Microbiology.
T. Kaneko, R. R. Colwell, and F. Hamons.
Chesapeake Science, Vol 16, No 1, p 3-13, March 1975, 2 fig, 7 tab, 18 ref.

Descriptors: *Mollusks, *Clams, *Bacteria, Animal physiology, Laboratory tests, Cultures, Systematics, *Mortality, Water pollution effects, Water pollution sources, *Maryland, Chesapeake Bay.
Identifiers: *Bacteriology, Mya arenaria, Vibrio, Enterobacteriaceal, *Wicomico River(Md).

Several screening tests were performed in experiments designed to detect the presence of potential pahtogens in the soft-shell clam Mya arenaria. Of 16 strains isolated from test plates at cold temperatures, 8 strains were found to cause death of animals within 48 hours and to show good growth at 4 degrees C within one week. Two of the 8 strains, one a member of the Enterobacteriaceae and the other a Vibrio sp., were considered to be potential pathogens for the soft-shell clam. (Klein)
W76-00873

IN VITRO INHIBITION OF FISH BRAIN ATPASE ACTIVITY BY CYCLODIENE INSECTICIDES AND RELATED COMPOUNDS,
Minnesota Univ., St. Paul. Dept. of Entomology, Fisheries and Wildlife.
H. H. Yap, D. Desaiah, L. K. Cutkomp, and R. B. Koch.
Bulletin of Environmental Contamination and Toxicology, Vol 14, No 2, p 163-167, August 1975. 2 tab, 16 ref.

Descriptors: *Chlorinated hydrocarbon pesticides, *Toxicity, Fish physiology, *Enzymes, Inhibitors, Analytical techniques, *Insecticides, Water pollution effects, Inhibition.
Identifiers: *Bluegills, Lepomis macrochirus, *Inhibitory responses, *ATPases, *Cyclodienes, ID50, Bioaccumulation, Tissue analysis.

Brain tissue from the blue gill fish, Lepomis macrochirus, was used as the enzyme source to compare inhibitory responses of three ATPases ($2Mg2+$ ATPases and $Na+K+$ ATPase) to several cyclodiene and related compounds at 20.8 micromolar concentration. A comparison of ID50 values (Inhibition-Dose response at 50% level) for several chlorinated hydrocarbon insecticides on mitochondrial $Mg2+$ and $Na+K+$ ATPases was made. (Klein)
W76-00874

MERCURY RESIDUES IN FATHEAD MINNOWS, PIMEPHALES PROMELAS RAFINESQUE, CHRONICALLY EXPOSED TO METHYL-MERCURY IN WATER,
National Water Quality Lab., Duluth, Minn.
G. F. Olson, D. I. Mount, V. M. Snarski, and T. W. Thorslund.
Bulletin of Environmental Contamination and Toxicology, Vol 14, No 2, p 129-133, August 1975, 2 tab, 14 ref.

Descriptors: *Heavy metals, *Organic compounds, *Mercury, *Minnows, *Metabolism, Fish physiology, Life cycles, Path of pollutants, Water quality, Toxicity, Water pollution effects, Absorption.
Identifiers: *Fathead minnows, Pimpephales promelas, *Methylmercury, Bioaccumulation, Tissue analysis.

Fathead minnows, Pimephales promelas, were exposed to methylmercury water concentrations ranging from 0.018-0.247 micrograms/liter. After 48 weeks of exposure(lifespan), the total mercury residues in the whole fish body ranged from 1.47-10.90 micrograms/gram. The pronounced uptake of methylmercury and a limited ability to excrete it by the fish suggested that even very low concentrations of methylmercury in water might result in unacceptable tissue levels in fish. (Klein)
W76-00875

CAUSES OF DECREASE AND DISAPPEARANCE OF THE SEAGRASS POSIDONIA OCEANICA ON THE FRENCH MEDITERRANEAN COAST (CAUSES DE LA RAREFACTION ET DE LA DISPARATION DES HERBIERS DE POSIDONIA OCEANICA SUR LES COTES FRANCAISES DE LA MEDITERRANEE),
Centre d'Oceanographie, Marseille (France). Station Marine d'Endoume.
For primary bibliographic entry see Field 5B.
W76-00876

TRACE METAL LEVELS IN BEACH DIPTERANS AND AMPHIPODS,
Stanford Univ., Pacific Grove, Calif. Hopkins Marine Station.
For primary bibliographic entry see Field 5A.
W76-00877

MERCURY LEVELS IN GEORGIA OTTER, MINK, AND FRESHWATER FISH,
Duke Power Co., Charlotte, N.C. Design Engineering Dept.
For primary bibliographic entry see Field 5A.
W76-00878

NUCLEAR SHIP POLLUTION: NATIONAL AND INTERNATIONAL REGULATION AND LIABILITY,
For primary bibliographic entry see Field 6E.
W76-00921

UNION OIL CO. V OPPEN: RECOVERY OF A PURELY ECONOMIC LOSS IN NEGLIGENCE (NOTE ON CASE ARISING FROM OIL SPILL).
For primary bibliographic entry see Field 6E.
W76-00924

SAVE OUR SOUND FISHERIES V CALLAWAY (ACTION TO ENJOIN DUMPING DREDGED SPOIL INTO NAVIGABLE OCEAN WATERS).
387 F Supp 292-310 (DRI 1974). 19 p.

Descriptors: *Judicial decisions, *Federal Water Pollution Control Act, *Permits, *Legislation, *Dredging, Rhode Island, Administration, Contract administration, Federal government, State governments, Water law, Governmental interreiations, Legal review, Environmental effects, Legal aspects, Water pollution, Water pollution control, Water pollution sources.
Identifiers: *National Environmental Policy Act, *Injunctive relief, *Environmental impact statement, *Marine Protection Research and Sanctuaries Act, *Corps of Engineers, Environmental Protection Agency, Fill permits.

Plaintiff, a non-business corporation, composed of corporations which harvest and process seafood, sued to enjoin defendants, U. S. Army Corps of Engineers and a private corporation retained under government contract, from dumping dredged spoil into the ocean. The thrust of plaintiff's complaint was that defendants failed to comply with procedural requirements of various federal laws relating to environmental protection by neglecting to obtain permits, give public notice and opportunity for hearing, and make public disclosure of environmental impact information prior to commencing dredging. Defendants argued that the dumping was part of a project authorized prior to the Marine Protection, Research and Sanctuaries Act and, therefore, required no permit. The court held that the funding for the final stage of the project was appropriated subsequent to statutes requiring a permit, and defendant, therefore, was enjoined from further dumping until compliance with permit procedures. The court further held that 33 U.S.C. section 1344 did not exempt the Corps from complying with permit procedures in authorizing the Secretary of the Army, rather that the Environmental Protection Agency (EPA), to issue permits for dredging and filling for the purpose of improving navigation. (Jenkins-Florida)
W76-00939

THE QUEST FOR OIL: A DECISIVE FORCE IN THE LAW OF THE ARCTIC SEA PERTAINING TO POLLUTION,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00969

FLUORIDE POLLUTION,
National Research Council, Washington, D. C.
E. Groth, III.
Environment, Vol 17, No 3, p 29-38, 1975. 3 photo, 86 ref.

Descriptors: *Fluorides, *Environmental effects, *Research priorities, *Research and development, *Pollutants, Industrial wastes, Air pollution, Animal populations, Aquatic populations, Toxicity, Phosphates, Aluminum, Water supply, Water treatment, Pollution abatement, Wastes, Air pollution effects.
Identifiers: Research data, Effluent charges.

Preliminary research data indicate that fluoride can result in significant ecological harm, even at low levels. This chemical has received low priority in research and regulatory control efforts. There is evidence that accumulated levels of fluoride in plant and animal life have caused a major increase of fluoride in aquatic and land food chains. Reduction in fluoride emissions by control regulations may be offset by the rapid growth of the phosphate fertilizer and aluminum industries which emit fluoride. While fluoride pollution mainly occurs from industrial sources, there are more sources of fluoride in the aquatic environment. Although fluoride is present in natural water sources, industrial and domestic sewage discharge accounts for most fluorides. The chemical is best known for its ability to prevent tooth decay and is added to water systems in about one half the communities in the United States. It is likely that fluoride interacts with other pollutants to produce a more toxic effect. Calcium may act to reduce fluoride concentrations. The lack of solid experimental data on the toxic effects of fluoride demonstrates that this chemical should be given higher priority in future environmental research projects. (Jenkins-Florida)
W76-00975

MARINE TOWING, INC. V. RED STAR TOWING AND TRANSPORTATION CO. (ACTION FOR DAMAGES SUFFERED WHEN TUG STRUCK A WRECK IN NAVIGABLE WATERS).
For primary bibliographic entry see Field 6E.
W76-00983

LEGAL ASPECTS OF PHOSPHATE MINING IN NORTH CAROLINA,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6G.
W76-00984

HUMAN ECOLOGY. PROBLEMS AND SOLUTIONS,
P. R. Ehrlich, A. H. Ehrlich, and J. P. Holdren.
W H Freeman and Co.: San Francisco, Calif, 1973, 304 p, Illus.

Descriptors: *Environmental effects, Ecology, Human population, Human resources, Natural resources, Technology.

A comprehensive introducation to human ecology, this book focuses attention on the biological and physical aspects of man's present prlblems. Demography, man's utilization of resources, the world food problem and man's assaults on his own health and on ecological systems are described. Interrelationships of population growth, affluence and technological errors are causes of what may be the most serious crisis ever faced by man. Having established the need to hald population growth, the discussion turns to what is being done in this area, and to what needs to be done. After a discussion of possible population control methods the other aspects of human behavior are evaluated. Emphasis is placed on reducing each individual's demand and deleterious impact of the environmental resources. Man's problems are intertwined and it is concluded that ecological problems will not be solved unless racism, poverty, exploitation and war are tackled at the same time. This book is intended for use in various courses dealing with environmental problems and ecology.--Copyright 1973, Biological Abstracts, Inc.
W76-00987

AGRICULTURE'S PLACE IN THE ENVIRONMENT: CONSIDERATIONS FOR DECISION MAKING,
Agency for International Development, Washington, D.C.
W. H. Garman.
J Environ Qual, Vol 2, No 3, p 327-333, 1973.

Descriptors: *Eutrophication, Aquatic plants, Path of pollutants, Nutrients, Organic matter, Agricultural chemical, Fertilizers.

Chemical elements at or near the earth's surface and in the air are in a continuing state of movement or subject to forces which can cause movement. The outstanding characteristic is that outgo of inorganic elements (including plant nutrients) from land to water greatly exceeds input over most land surfaces of the earth. Nutrients have been accumulating under water along the shorelines of the world for ages of time. When man entered the geological picture, this movement (or water-enrichment process) became more active as the soil was worked to grow food. This caused more soil particles, nutrients and organic matter to move into water bodies. Eutrophication is nature's ageold geological process of utilizing these nutrients and the sun's energy for the accumulation of organic matter in aqueous environments. Without eutrophication, there would be no marine life or coal oil or muck deposits on out planet. All bodies of water have 4 stages of life: birth, existence, old age and disappearance. Examples of each stage are found in the USA, Canada, Siberia, Brazil, and Africa, in surroundings practically untouched by man and certainly untouched by agriculture. Only very small quantities of nitrates and mineral nutrients are necessary to sustain luxuriant growth of aquatic plants. Most water bodies contain ample amounts for this purpose. Few situations likely can ever be found where stopping agricultural contribution would stop eutrophication. Slowing the process of eutrophication will be difficult because it will require control over C inputs. Organic matter from sewage, manure runoff, industrial wastes, or wildlife is utilized by bacteria, which evolve CO2 for promoting the growth of aquatic plants. Once the process is in operation, it is difficult to control because photosynthesis releases O2 to stimulate bacteria. When they and other plants die, their C and nutrients are consumed by more bacteria, which in turn, evolve more CO2 to grow more algae, thus continuing the cycle. Although details of this symbiosis are not fully understood, enough is known to realize that removing P or N from city effluents or from farm fertilizers will not control growth of aquatic vegetation in natural or man-made bodies of water.--Copyright 1974, Biological Abstracts, Inc.
W76-00988

PATHOLOGICAL CHANGES OBSERVED IN FISHES FOLLOWING POISONING BY GRANULATED HERBICIDES-ATRAZINE AND DIURON: RAPID DETERMINATION OF THE TOXICITY OF LOW PESTICIDE CONCENTRATIONS (IN RUSSIAN),
For primary bibliographic entry see Field 21.
W76-00995

SPHAEROMA TEREBRANS: A THREAT TO THE MANGROVES OF SOUTHWESTERN FLORIDA,
University of South Florida, Tampa. Dept. of Biology.
A. Rehm, and H. J. Humm.
Science (Wash DC), Vol 182, No 4108, p 173-174, 1973, Illus.

Descriptors: *Mangrove swamps, Florida.
Identifiers: Sphaeroma terebrans, *Wood borers, Borers.

S. terebrans, a wood-boring isopod, is destroying the prop roots of red mangroves (Rhizophora mangle) along the southwestern coast of Florida (USA) to such an extent that the Ten Thousand Islands and mangrove fringes of the mainland are steadily shrinking. Mangroves of the Florida Keys apparently are free of this wood borer.--Copyright 1974, Biological Abstracts, Inc.
W76-00998

5D. Waste Treatment Processes

VALLEY FORGE AREA WASTEWATER TREATMENT FACILITY, CHESTER COUNTY, PENNSYLVANIA, FINAL ENVIRONMENTAL IMPACT STATMENT.
Environmental Protection Agency, Philadelphia, Pa. Region III.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-236 325, $17.25 in paper copy, $2.25 in microfiche. September, 1974. 426 p, 15 fig, 48 tab, 21 plates, 10 append.

Descriptors: *Administration, *Treatment facilities, *Waste water treatment, Sewers, Federal Water Pollution Control Act, Water quality control, Environmental effects, Grants, *Pennsylvania.
Identifiers: *Construction grants, *Environmental Impact Statement, *Valley Forge(Penn).

An administrative action was taken by the Environmental Protection Agency involving the granting of financial assistance for the construction of a 8 mgd waste water treatment facility and related sewage collection system. Several municipalities in the area of Valley Forge, Pennsylvania, will receive construction grants as dictated in the Federal Water Pollution Control Act Amendments. This final Environmental Impact Statement (EIS) details the climatology, topography, hydrology, geology, man-made environment, air and water quality, population, and land management characteristics of the area serviced. The proposed facilities were designed to meet the waste water treatment needs for eight areas in Chester County as projected to the year 1985, and to alleviate public health hazards, improve water quality, and permit orderly growth patterns in the area. Evaluations were made of several alternatives including individual treatment processes and sewer line locations. Processes such as incineration, landfilling, landspreading, and spray irrigation were also considered. Included in this final EIS are a list of Federal, State and local agencies from which comments on the Draft EIS had been received, a detailed glossary, and 21 maps of the region. Appendices refer to the history of the proposed project; letters and petitions from residents; designated historical and archaeological sites; existing environmental controls; lists of area industries; and a summary of a Public Hearing held on January 10, 1974. (Kramer-FIRL)
W76-00508

STREAM POLLUTION ABATEMENT BY SUPPLEMENTAL PUMPING,
Richmond City Dept. of Public Utilities.
C. W. Reh, and W. E. Sadler.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-239 566, $5.25 in paper copy, $2.25 in microfiche. Environmental Protection Agency, Report EPA-670/2-75-035, February 1975. 108 p, 39 fig, 5 tab, 17 ref.

Descriptors: *Waste water treatment, *Bypasses, *Treatment facilities, *Pumping plants, Construction, Costs, Pumps, Sewage treatment, *Virginia, Pollution abatement.
Identifiers: *Richmond(Va).

A major structure (a Supplemental Pumping Station), and several ancillary structures were added to the Richmond, Virginia, Wastewater Treatment Plant to achieve the project objective of no bypassing while a new grit chamber was being connected ahead of the existing Main Pumping Station. The Supplemental Pumping Station was constructed by sinking a two-compartment, sheet cofferdam around an existing 72-in concrete sewer and rearranging the influent sewer flow pattern so that the sewage was redirected to the site of the Supplemental Pumping Station. Redirection of the sewage flow was effected by the reconstruction of a junction chamber and by the insertion of a specially designed removable bulkhead. The project demonstrated that it is possible to cut in a major sewage treatment plant addition without bypassing raw sewage. If no special provisions have been made in the existing works or new facility design for additions without bypassing, special design will be required to achieve the no bypassing objective. Pumping units of standard desing can be used. Pumps were variable speed motor driven vertical centrifugal pumps. The time for design and construction of so-called temporary facilities is likely to approach that required for conventional facilities. This project required 36 months. The cost of the supplemental pumping station and appurtenant works was $900,000. (Orr-FIRL)
W76-00509

FORECASTS OF THE EFFECTS OF AIR AND WATER POLLUTION CONTROLS ON SOLID WASTE GENERATION.
Stone (Ralph) and Co., Inc., Los Angeles, Calif.
Available from the National Technical Information Service, Springfield, Va 22616, as PB-238 819, $17.25 in paper copy, $2.25 in microfiche. Environmental Protection Agency, Report EPA-670/2-74-095b, December, 1974. 799 p, 41 fig, 242 tab, 440 ref, 4 append.

Descriptors: *Waste water treatment, *Solid wastes, *Industrial wastes, *Sewerage, Pollution abatement, Water pollution control, Air pollution, Suspended solids, Dissolved solids, Biochemical oxygen demand, Water pollution sources.

The effects of air and water pollution treatment measures on the generation of solid wastes were

evaluated. The solid wastes from pollution control were identified for the following sectors by their original air or water pollutant constituents and the treatment process employed: animal feedlots; mining and milling; meat and dairy products; canned and preserved fruits and vegetables; grain industry; paper and allied products; chemicals and allied products; petroleum extraction, refining, and transportation; cement manufacturing and structural clay; blast furnace and basic steel industries; iron foundry and ferroalloy industries; primary and secondary smelting and refining of nonferrous metals; electric power plants; sewerage; and hazardous solid waste residues. The wastes were categorized by type and by location (rural or urban). Total solid wastes from pollution control activities were estimated for 1971 and projected for 1975, 1980, and 1985. The major air pollutants that generate solid waste residues when controlled are particulates and sulfur oxides. The major water pollutants capable of generating solid waste residues when controlled are suspended solids, dissolved solids, and biological oxygen demand. Some of the commonly-used wet process air pollution treatments also generate suspended solids which add to the total water pollutant load. Acids in water form solid wastes when inert salts are formed by their neutralization or precipitation. Urban runoff is a significant source of pollution. (Orr-FIRL)
W76-00510

EVALUATION OF NEW REVERSE OSMOSIS MEMBRANES FOR THE SEPARATION OF TOXIC COMPOUNDS FROM WASTEWATER, SECOND ANNUAL SUMMARY REPORT,
Illinois Univ. at Urbana-Champaign. Dept. of Environmental Engineering.
E. S. K. Chian, and H. H. P. Fang.
Available from the National Technical Information Service, Springfield, Va 22161, as ADA-005 238, $5.25 in paper copy, $2.25 in microfiche. Technical Report No UILU-ENG-74-2028, October, 1974. 103 p, 17 fig, 34 tab, 18 ref, 3 append.

Descriptors: *Membrane processes, *Reverse osmosis, *Waste water treatment, Organic compounds, Laboratory investigation, Mathematical studies, Design criteria, Analytical techniques.
Identifiers: NS-100 membrane, Toxic compounds, Factorial analysis.

Results of the second year of a study on the evaluation of reverse osmosis membranes for separation of toxic compounds from waste water are presented. In previous study, it was determined that the best results in treating waste water consisting of various small polar organic compounds were accomplished with the use of NS-100 membranes and aromatic polyamide membranes. While both showed excellent results in removing either organic or inorganic solutes, the NS-100 had a flux of a higher magnitude and was chemically and biologically more stable than the aromatic polyamide membrane. Thus, an extensive study was conducted on the characteristics of the NS-100 membrane, including the formulation of mathematical models to predict its performance under various conditions. Also, a comparison between newly developed reverse osmosis membranes obtained from other laboratories was made, such as NS-200 and PBI, but NS-100 proved superior in performance. The tests on the NS-100 membrane included its performance in the removal of pesticides, thirteen model compounds, alcohols, fatty acids, amines; the effects of pH on the performance of the membrane; and optimization of membrane performance as demonstrated by factorial and other design criteria; and the resistance of the NS-100 membrane to chlorine. (Kramer-FIRL)
W76-00512

AN EVALUATION OF WATER REUSE FOR MUNICIPAL SUPPLY,
Southern Illinois Univ., Carbondale.
D. Dworkin, and D. O. Baumann.
Available from the National Technical Information Service, Springfield, Va 22161, as AD/A-005 053, $8.75 in paper copy, $2.25 in microfiche. Army Engineer Institute for Water Resources, Ft. Belvoir, Va. Report 74-11, December, 1974. 266 p, 31 fig, 33 tab, 2 append. DACW43-73-C-0013.

Descriptors: *Water supply, *Water demand, *Municipal water, *Water reuse, *Waste disposal, Potable water, Waste water treatment, Recycling, Effluents, Public health, Economics, Simulation, Planning, *Colorado, *Computer programs.
Identifiers: *Colorado Springs(Colo).

Because of an increase demand on municipal water supply systems, reuse as an alternative water source has been considered. Reuse was defined as any additional application of waste water, including inadvertent and unplanned withdrawal and use of water from a river with an upatream discharge, directed and planned secondary treatment, or use of effluents for irrigation, recreation, or industry. An evaluation was made as to whether recycling renovated waste water could be an acceptable and economically efficient alternative. An investigation was made to identify the opinions of state public health officials and consulting engineers toward the practicability of using renovated water. A simulation model as applied to the Colorado Springs, Colorado, water supply system is detailed. Alternative plans, providing for reuse only when required were suggested. Manipulation of water supply and water demand was discussed and the public acceptance or rejection of using renovated water was debated. (Kramer-FIRL)
W76-00514

INTERCEPTOR SEWERS AND SUBURBAN SPRAWL: THE IMPACT OF CONSTRUCTION GRANTS ON RESIDENTIAL LAND USE. VOLUME I, ANALYSIS.
Urban Systems Research and Engineering, Inc., Cambridge, Mass.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-236 477, $7.00 in paper copy, $2.25 in microfiche. Council on Environmental Quality, Washington, D.C., July 31, 1974. 191 p, 8 fig, 1 tab, 2 append.

Descriptors: *Interceptor sewers, *Constructions, *Environmental effects, Federal project policy, Design, *Land use, Land management, Administration, Water resources development, Sewerage.
Identifiers: *Public policy analysis, Federal funding, Sewer construction, Residential development.

A study was conducted in the summer of 1974 to consider the relationships between interceptor sewer construction financed by the Environmental Protection Agency and residential development patterns in rapidly growing communities. A statistical analysis of data from fifty-two interceptor projects was made and case studies for eight local projects with high excess capacity and the largest proportion of vacant developable land in the service area were analyzed. A discussion is given of major interceptor planning and land policy issues, with recommendations for changes in EPA procedure based upon policy analysis. These recommendations included: withholding of Federal funds for excess capacity; re-evaluation of interceptor staging of project design in rapidly growing areas; application of realistic standards for per capita flow; improvement of population forecasting techniques; consideration of environmental effects of interceptor-induced land use; and publicity of community costs and benefits of interceptor-induced growth so as to increase public participation in the planning process. (Kramer-FIRL)
W76-00515

O AND M GUIDE FOR THE SUPPORT OF RURAL WATER-WASTEWATER SYSTEMS.
Conset, Inc., Washington, D.C. National Demonstration Water Project.
For primary bibliographic entry see Field 5F.
W76-00530

COMMON FUNDAMENTALS IN THE TECHNOLOGIES OF WATER AND WASTE-WATER TREATMENT, (A VIZ-ES SZENNYVIZTITAS TECHNOLOGIAIAJAUAK KOZOS ALAPJAI),
P. Benedek, L. Bulkay, and S. Vallo.
Vizugyi Kozlemenyek, No 2, p 210-223, 1975. 8 tab, 3 ref.

Descriptors: *Waste water treatment, *Water treatment, *Treatment facilities, *Biological treatment, Separation techniques, Potable water, Organic compounds.
Identifiers: *Hungary.

A comparison was made between technologies used in water treatment and waste water treatment in Hungary. It was shown that both types of processes are based on the separation of substances according to size. Several tables are presented, systematically comparing the efficiencies of various technologies which are common to both potable water treatment and waste water treatment. In the treatment of waste water, the transformation of organics into inorganics and their subsequent removal, usually by biological treatment, is frequently necessary. In treatment of drinking water, the goal is generally the removal of undesired substances and sometimes the addition of specific chemicals. Despite the difference in objectives, this paper recommends that professionals in the fields of water treatment and waste water treatment note the similarities of the technology applied. (Kramer-FIRL)
W76-00561

DESIGNING WATER TREATMENT PLANTS AT THE CIVIL ENGINEERING CONSULTING FIRM MELYEPTERV (VIZTISZTITAS TERVEZES A MELYEPTIESI TERVEZO VALLALATNAE),
Melyepterv, Budapest (Hungary).
For primary bibliographic entry see Field 5F.
W76-00562

INFILTRATION INFLOW PROGRAM FOR EPA GRANTS,
R. A. Beckwith.
Water and Sewage Works, Reference Number, p 16-18, April 30, 1975. 2 fig.

Descriptors: *Infiltration, *Inflow, *Legislation, *Sewerage, *Sewage treatment, Treatment facilities, Rainfall-runoff relationships, Sewers, Federal Water Pollution Control Act, Groundwater, Simulation analysis, *Waste water treatment.
Identifiers: Sewer repair, Infiltration inflow programs.

Federal legislation requires that municipalities applying for new grant funds for interceptors and sewage treatment plants prove their existing sanitary sewer systems are not subject to excessive infiltration/inflow (i/i). Infiltration is primarily leakage from the groundwater table and occurs into cracked pipe, deteriorated lateral connections, or offset joints. Inflow is mainly the water entering a sanitary sewer system from rainfall runoff. Inflow sources are relatively easy to locate and correct, and include manhole covers, roof leaders, area-way drains, basement drains, and connections between storm and sanitary sewers. An i/i program consists of analysis and evaluation. The analysis portion is an overall study of various subsystems, accomplished by studying records of the sewage plant, water plant, and rainfall of an area, and by making selected flow measurements at predetermined key manholes. A choice is then made between continued treatment and evaluation for possible rehabilitation, depending upon which is more economical. Following analysis, evalua-

tion may be performed on recommended areas and consists of a physical survey, rainfall simulation, preparatory cleaning, television inspection, and a cost effective analysis. By locating exact defects and estimating the amount of leakage, it can best be determined whether it is more costly to rehabilitate the defect or to continue treatment of the infiltration/inflow. (Kramer-FIRL)
W76-00563

PREPARING AN INFILTRATION/INFLOW ANALYSIS,
Gilbert Associates, Inc., Reading, Pa.
P. A. Podolick.
Water and Sewage Works, Reference Number, p 31-32, 34, April 30, 1975. 1 tab.

Descriptors: *Infiltration, *Inflow, *Sewerage, *Waste water treatment, Construction, Analytical techniques, Cost analysis, Repairs, Weirs, Sewers.
Identifiers: *Infiltration/inflow, Sewer rehabilitation.

In order to receive Federal funding for upgrading a secondary treatment plant to provide tertiary treatment, it was necessary for an engineering and consulting firm in Pennsylvania to perform an analysis to demonstrate to the EPA that the sewer system discharging into the treatment works was not subject to excessive infiltration/inflow (i/i). First, a review for the past several years of total daily waste water flow was done to compute average daily dry and wet weather flows. Geological and geographic factors were considered, which might influence quantities of waste water flow. Engineering reports and contract documents for the original construction of the sewage facility were also reviewed. Field measurements of drainage from potential infiltration/inflow sources were made between midnight and 5:00 a.m. for key manholes, in order to insure that the measurements were due to i/i and not to domestic sewage. V-notch weirs were used for measurements directly into the sewer pipes. Cost of eliminating infiltration/inflow were determined by sewer system evaluation and a calculation of sewer rehabilitation costs. A cost effective analysis was performed, and it was found that the annual cost of eliminating all the i/i possible and treating the rest was $11,355, while the annual cost of treating i/i for the design life of the facility would be $33,226. Thus, Federal law stated that 'possible' excessive infiltration/inflow existed and that further evaluation was required. (Kramer-FIRL)
W76-00564

THE SELECTION AND APPLICATION OF SLURRY PUMPS,
For primary bibliographic entry see Field 8C.
W76-00565

HOW TO ANALYZE INFILTRATION/INFLOW,
Environmental Protection Agency, Cincinnati, Ohio.
D. J. Cesaro, and R. Field.
Water and Sewage Works, Reference Number, p 84-88, 90, April 30, 1975. 2 tab, 11 ref.

Descriptors: *Infiltration, *Inflow, *Reviews, Analytical techniques, *Sewerage, Construction, Rehabilitation, Rainfall, Inspection, Water quality, Opearting costs, Maintenance costs, Flooding, *Waste water treatment.
Identifiers: Cost-effectiveness, Infiltration/inflow analysis, Sewer repair, Sewer system evaluation.

A review of the analysis of infiltration/inflow (i/i) is presented. A thorough evaluation should consider factors of cost-effectiveness, including: the cost and size of new sewers if excessive i/i is to be permitted; the operation and maintenance costs for handling local sewer surcharges, clean-up of flooding, and damages to flooded private properties; costs of repair of pavement cave-ins or washouts of subsurface utilities caused by i/i; costs of removal of soil, debris, and tree roots which enter sewers through defective sewer joints and pipes; and need for increases in treatment or handling capacities because systems are overloaded with excessive infiltration and inflow volumes. The required sewer system evaluation survey, consisting of five phases (Physical survey, rainfall simulation, preparatory cleaning, internal inspection, and survey report) is outlined. Guidelines for cost analyses of infiltration and inflow are also given. Examples of an infiltration reduction program in Oklahoma and an inflow reduction program in Illinois illustrate some of the problems encountered. Although a cost-effective solution is strongly recommended, it was concluded that one should always consider the overall impact of any changes on overall water quality. (Kramer-FIRL)
W76-00566

PROCESS FOR TREATING SEWAGE SLUDGE,
American Cyanamid Co., Stamford, Conn. (Assignee).
H. P. Panzer, and K. W. Dixon.
United States Patent 3,894,948. Issued July 15, 1975. Official Gazette of the United States Patent Office, Vol 936, No 3, p 1008, July, 1975. 1 fig.

Descriptors: *Patents, *Sludge treatment, *Dewatering, *Polymers, *Waste water treatment, Anions, Cations.
Identifiers: Polyquaternary compounds.

A patent was granted for a method of sewage sludge treatment. An effective amount of a water-dispersible polyquaternary polymer is added to the sewage, comprising the reaction product of dimethylamine, a polyfunctional amine, and a difunctional epoxy compound selected from the group consisting of epihalohydrins and precursors for epihalohydrins which under alkaline conditions are readily converted into the corresponding epoxy compounds and their mixtures. The polyquaternary polymer structures are detailed, and the residues obtained from the compounds and their reactions are described. The amount of anions present is large enough to satisfy anionic requirements of the cationic portion of the polyquaternary compound and thus water is removed from the sludge. (Kramer-FIRL)
W76-00567

APPARATUS FOR DISSOLVING LARGE QUANTITIES OF OXYGEN IN WATER,
Naigai Kogyo Kabushiki Kaisha, Tokyo (Japan). (Assignee).
T. Aoki.
United States Patent 3,882,205. Issued May 6, 1975. Official Gazette of the United States Patent Office, Vol 934, No 1, p 327, May, 1975. 1 fig.

Descriptors: *Oxygenation, *Aeration, *Patents, Equipment, *Water treatment, *Waste water treatment, *Dissolved oxygen.

The patented apparatus described is designed for dissolving large quantities of oxygen in water. It is composed of: an air-tight cistern; a tank on the cistern; an elongated inner vessel in the cistern with a perforated partition between it and the tank; a rotary shaft with a perforated drum, positioned perpendicularly within the tank; pipes for supplying oxygen to the drum and water to the tank; spouts which discharge water into a receiving dish on the rotary shaft; and, conduits to feed water and to control discharge of water to the dish from the spouts. Water is finely divided by the high speed rotation of the dish caused by rotation of the rotary shaft. Oxygen is released into a circular space between the outer circumference of the drum and the inner circumference of the tank through perforations, due to the centrifugal force of the drum also being rotated by the shaft. Water and oxygen mixing occurs continuously, dissolving a large volume of oxygen into the water. The water enters the inner vessel through the perforated partition and is then passed into the cistern through an opening on the vessel. (Orr-FIRL)
W76-00570

MOBILE PURIFYING PLANT FOR WASTE WATER,
B. O. Lundqvist.
Canadian Patent 971,688. Issued July 22, 1975. Patent Office Record, Vol 103, No 29, p 85, July, 1975.

Descriptors: *Waste water treatment, *Biological treatment, Water purification, Equipment, *Patents, *Treatment facilities.
Identifiers: *Mobile treatment systems, Alum.

A portable biological purification system has been patented, which is small enough to be easily transported by highway. This waste water treatment system is within a housing and consists of provisions for biological purification, for mixing aluminum sulfate into the biologically purified water, for separating the deposited particles from the water, and for collection of these separated particles in a tank. All the equipment is located in one wall of the housing, so that a compact plant is created. (Kramer-FIRL)
W76-00572

AEROBIC/ANAEROBIC COMPOSTING DEVICE AND METHOD OF COMPOSTING,
F. B. Chester.
United States Patent 3,890,129. Issued June 17, 1975. Official Gazette of the United States Patent Office, Vol 935, No 3, p 1178, June, 1975. 1 fig.

Descriptors: *Waste water treatment, *Patents, *Aerobic conditions, *Anaerobic digestion, Organic compounds.
Identifiers: *Composting(Aerobic-Anaerobic).

A method for composting organic waste material has been patented. The organic waste material is first placed in a rotatable container which has open mesh sides. The open mesh sides of the container are covered with a removable outer cover of moisture excluding material. The container with the waste material is periodically rotated about a horizontal axis with the outer cover attached. The rotation mixes the material in the container and contacts the material with air. The periodic rotation of the container is then stopped an an inner second cover is placed over the material within the container. The inner cover directly contacts the material in the container and prevents air from freely contacting the waste. The inner and outer covers are then removed from the container. The rotation of the container (uncovered) is resumed. The continued rotation effects discharge of composted waste material from the container through the open mesh sides of the continer. (Orr-FIRL)
W76-00574

AUTOMATIC SCUM REMOVAL TROUGH,
Harrisburg Steel Co., Pa.
P. R. Johnson.
United States Patent 3,890,289. Issued June 17, 1975. Official Gazette of the United States Patent Office, Vol 935, No 3, p 1222-1223, June, 1975. 1 fig.

Descriptors: *Waste water treatment, *Patents, Equipment, Scum, Water treatment, Automation, *Separation techniques.
Identifiers: Floating scum removal.

An apparatus to remove floating scum from the surface of liquid in a tank has been patented. The apparatus is composed of a trough with side walls, support means in the tank secured to the trough, drive means, connector means sucured between the drive means and the trough, means to energize the drive means, and, liquid sensor means to de-energize the drive means. The support means are

adapted to permit vertical movement of an edge of one of the sidewalls of the trough. The trough is first moved in one direction by the drive means. The liquid sensor mean stops the travelling of the trough after the edge of the trough has moved a predetermined distance below the surface of the liquid in the tank. The drive means are then energized to move the trough in another direction. (Orr-FIRL)
W76-00578

PRESSURE SEWAGE SYSTEM AND MEANS,
Robintech, Inc., Fort Worth, Tex. (Assignee).
J. Burkholder.
United States Patent 3,897,600. Issued August 5, 1975. Official Gazette of the United States Patent Office, Vol 937, No 1, p 20, August, 1975. 1 fig.

Descriptors: *Patents, *Sewage treatment, Sewerage, Tanks, Pipes, Equipment, *Waste water treatment, Gravity.
Identifiers: *Pressure sewage system, Gravity-fed sewage.

A pressure sewage system which has been recently patented is described. The unit accumulates and treats gravity-fed sewage which it receives through an inlet pipe from a local source. Solids within the sewage are macerated and the resulting effluent is discharged under a pre-determined pressure into a pressurized sewer main. The unit consists of: an accumulation tank, with downwardly converging walls and a frusticonical bottom section to receive the sewage; a central sewage treatment unit, which is normally submerged below the sewage level in the tank and rests on the converging walls; a small diameter discharge pipe which extends upward from the treatment unit and connects to the pressurized sewer main; and, a pump within the treatment unit having exposed macerating blades, which are rotatable about the central axis of the frustoconical section. Thus, sewage is agitated and swirled into a vortex while the treatment unit is in operation. (Kramer-FIRL)
W76-00579

INCENERATOR FOR RAW SEWAGE,
Morse Boulger, Inc., Flushing, N.Y. (Assignee).
For primary bibliographic entry see Field 5E.
W76-00580

PROCESS FOR TOTAL SEWAGE TREATMENT,
Activox, Inc., New York. (assignee).
P. L. Rongved.
United States Patent 3,900,394. Issued August 19, 1975. Official Gazette of the United States Patent Office, Vol 937, No 3, p 951-952, August, 1975. 1 fig.

Descriptors: *Patents, *Sewage treatment, *Activated sludge, *Waste water treatment, Biological treatment, Denitrification, Aerobic treatment, Sedimentation.
Identifiers: Clarification.

A continuous activated sludge sewage treatment process has been patented. Steps include: the introduction of a first sewage liquid into a reservoir at a speed of at least 0.8 feet per second; aeration of the sewage liquid which has been set into circulating motion; aerobic decomposition of the sewage and depletion of the oxygen content; introduction of additional sewage liquid into the oxygen-straved first sewage liquid; simultaneous denitrification of the first sewage liquid and aerobic decomposition of the second sewage liquid, and removal of the treated sewage liquid for sedimentation and clarification. The removal rate is approximately the same as the rate of injection of the raw sewage liquid. The resulting clarified liquid effluent is discharged and at least a portion of the settled sludge is returned to the liquid in the reservoir. The average retention time of the liquid in the reservoir is at least 24 hours. (Kramer-FIRL)
W76-00584

TREATMENT OF SEWAGE OR CONTAMINATED WATER,
D. A. Swales.
Canadian Patent 972,652. Issued August 12, 1975. Patent Office Record, Vol 103, No 32, p 34, August, 1975.

Descriptors: *Patents, *Sewage treatment, *Waste water treatment, *Coagulation, Costs, Acids.
Identifiers: *Chrome, Cost effectiveness.

A patent was issued for a method for the treatment of sewage or other contaminated waters. The process consists of forming a coagulant by dissolving chrome residue or chrome ore in a strong mineral acid, such as sulfuric acid or hydrochloric acid. By using a treatment method of coagulation which employs these substances, improved cost effectiveness is achieved. (Kramer-FIRL)
W76-00585

SWITCHING VALUE FOR CONTINUOUS FILTERING DEVICES,
Agfa-Gevaert, Mortsel (Belgium).
For primary bibliographic entry see Field 8C.
W76-00586

SELF-CLEANING ROTARY FLUID FILTRATION SYSTEM,
D. C. Marsh.
Canadian Patent 972,691. Issued August 12, 1975. Patent Office Record, Vol 103, No 32, p 42, August, 1975.

Descriptors: *Filtration, *Water treatment, *Waste water treatment, *Patents, Screens.

A filtration system in which contaminated liquid is passed through a filter screen is described. A pressure drop causes the contaminants to adhere to the screen. Back-flow of fluid through the screen caused by a hydrodynamic or aerodynamic skid removes any contaminants from the screen. Therefore,a self-cleaning filtration system is created. (Orr-FIRL)
W76-00587

WASTE TREATMENT SYSTEM WITH ENCLOSED SCREEN UNIT,
V. Materese.
Canadian Patent 973,304. Issued August 26, 1975. Patent Office Record, Vol 103, No 34, p 1, August 26,1975.

Descriptors: *Waste water treatment, *Waste treatment, *Solid wastes, Slurry, *Patents, Treatment facilities, Equipment, *Screens, Chemicals, Disinfection, Mixing.

The patented waste treatment system described includes means for grinding solid wastes, mixing them with liquids to form a pumpable slurry and pumping the slurry to a waste treatment tank. The waste treatment tank has a screening section in which an enclosed screen unit is loosely positioned. The slurry is pumped to the interior of the screen unit and then flows outwardly through the foraminous side walls of the screen unit into a mixing section of the treatment tank. As the screened waste material is passed from the screening section of the treatment tank to the mixing section, it is mixed with chemical additives. A series of perforated baffles in the mixing section insures that the additives and screened waste material are intimately mixed and retained in the tank for a sufficient period of time to disinfect the mixture prior to its ejection from an outlet in the mixing section of the treatment tank. (Orr-FIRL)
W76-00588

DEVICE AND APPARATUS FOR TREATING LIQUIDS SUCH AS DRINKING WATER AND WASTE WATER,
For primary bibliographic entry see Field 5F.
W76-00589

SEWAGE TREATMENT APPARATUS AND METHOD,
G. W. Smith.
Canadian Patent 972,088. Issued July 29, 1975. Patent Office Record, Vol 103, No 30, p 89, July, 1975.

Descriptors: *Patents, *Activated sludge, *Waste water treatment, *Biological treatment, Sewage treatment, Effluents, Sludge disposal, Aeration, Waste disposal.

A method and its related equipment were patented for use in the activated sludge treatment of sewage. Raw sewage is mixed with return (activated) sludge and the mixed sewage liquor is then confined in a tank and aerated. There may also be additional sub-surface aeration. Air is circulated through the sewage in a pre-determined vertical flow pattern through several flow passageways within the tank. After the required amount of time, the treated sewage liquids are removed from the tank; sludge is removed for recycle or ultimate disposal; and effluent water may be clarified. (Kramer-FIRL)
W76-00591

AERATION METHOD AND APPARATUS,
D. Di Gregorio, and G. L. Shell.
Canadian Patent 972,878. Issued August 12, 1975. Patent Office Record, Vol 103, No 32, p 84, August, 1975.

Descriptors: *Patents, Equipment, *Aeration, *Waste water treatment, Separation techniques.
Identifiers: *Aerators, Shearing mechanism.

A submerged aerator was patented and includes a non-impelling bubble shearing mechanism which rotates with and below an axial flow impeller. This impeller forces liquid down past the bubble shearing mechanism and entrains these bubbles in the downward flow. Increased retention of the shared bubbles in the lower portion of the liquid body thus results. The shearing mechanism is composed of: a hollow cylinder (with an open bottom to receive bubbles); a closed top concentrically secured to a rotating shaft; and a slotted sidewall through which the bubbles are released and sheared. (Kramer-FIRL)
W76-00592

SEWAGE FLOCCULATING AND SEDIMENTATION TANK UNIT,
K. R. Dunkers, and J. H. Johansson.
Canadian Patent 972,880. Issued August 12, 1975. Patent Office Record, Vol 103, No 32, p 85, August, 1975.

Descriptors: *Sewage treatment, Tanks, *Patents, *Flocculation, *Waste water treatment, Sedimentation, Flow, *Settling basins.

A highly efficient tank for the treatment of sewage has been patented. The unit is a combined sewage flocculating and sedimentation process. Flow of sewage is described, such that when seen in a plate view, the sewage is directed substantially perpendicular to the longitudinal direction of the tank. When viewed from a vertical section, flow is obliquely upward. Connections between the flocculating portion and the sedimentation protion are such that sewage flows through the tank and then to an outlet within the sedimentation portion. (Kramer-FIRL)
W76-00594

METHOD OF AND APPARATUS FOR FILTERING,
Hydromation Filter Co., Livonia, Mich. (assignee).
G. Hirs.
United States Patent 3,900,395. Issued August 19, 1975. Official Gazette of the United States Patent Office, Vol 937, No 3, p 952, August, 1975. 1 fig.

Descriptors: *Patents, *Filters, *Waste water treatment, Separation techniques, *Filtration.
Identifiers: Filter bed media, Black walnut shells, Anthracite coal, Solids removal.

A new filter device was patented for the removal of solids from liquid. The filter media bed is composed of anthracite coal, characterized by primary filter granules and smaller, fine, flaky particles. The bed has upper inlet and lower outlet surfaces; the smaller particles tend to accumulate at the inlet surface after backwashing and thus inhibit penetration into the anthracite bed by particulate contaminants. Positioned on the inlet surface of the bed are black walnut shells. These should be selected of a size and shape in relation to the fine anthracite particles in order to intermix with them after backwashing. The walnut shells have an angular, three-dimensional configuration to inhibit binding off the bed of anthracite coal byfine particles and accumulated contaminants. In the inlet surface of the filter media bed, a portion of the black walnut shells are intermixed with the smaller fine particles and provide a more effective penetration of the inlet surface by contaminants, thus improving the filter capabilities of the bed. (Kramer-FIRL)
W76-00595

PROCESS FOR TREATING WASTE WATER EFFLUENT HAVING ODOURS,
Daikyo Oil Co. Ltd., Tokyo (Japan). (assignee).
K. Tsutsumishita, Y. Yokoyama, and T. Egawa.
United States Patent 3,903,250. Issued September 2, 1975. Official Gazette of the United States Patent Office, Vol 938, No 1, p 333, September, 1975.

Descriptors: *Patents, *Waste water treatment, Effluents, Hydrogen ion concentration, Odor, Hydrogen sulfide, Organic compounds.
Identifiers: *Odor control.

A patent was issued for a treatment method for waste water containing hydrogen sulfide, mercaptanes, or other sulfur compounds, in order to eliminate undesirable odors. The pH of the waste water should be adjusted to 6 to 7 with a mineral acid or alkali; the waste water effluents may then be contacted with a hydrocarbon oil. The oil must have an average molecular weight of 100 to 300, and the mixing ratio of the hydrocarbon oil to the waste water effluent should be ten to one:one by volume. (Kramer-FIRL)
W76-00596

METHOD FOR THE PURIFICATION OF WATER,
N. Lindquist.
Canadian Patent 972,484. Issued August 5, 1975. Patent Office Record, Vol 103, No 31, p 85, August, 1975.

Descriptors: *Patents, *Sewage treatment, *Flocculation, *Nutrient removal, Biological treatment, *Waste water treatment, Oxygen, Microorganisms, Organic matter, Biodegradation, Iron, Aluminum, Separation techniques.

A method has been patented for the purification of sludge-free sewage which contains biodegrable organic material and phosphorus compounds. Sewage is passed through an oxygen-containing gas, and through a permeable bed which contains at least one metal of the group consisting of iron aluminum. The flow of the oxygen-containing gas is then adjusted, as is the thickness of the bed, so that biological microorganisms capable of decomposing the organic material in the sewage are formed in at least one portion of the bed. At the same time, at least one metal is dissolved from the bed in a large enough quantity to flocculate most of the phosphorus compounds in the sewage. The permeability of the bed must be such that the formed phosphorus-containing flocs, together with the formed biological flocs, are able to pass through the bed and the sewage is then separated from these flocs. (Kramer-FIRL)
W76-00597

RECENT TRENDS OF INSTRUMENTATION, CONTROL, AND AUTOMATION SYSTEMS FOR WASTEWATER TREATMENT SYSTEMS (GESUIDO SHISUTEMU SEIGYO NO DOKO),
S. Kato, and T. Oto.
Hitachi Hyoron, (Hitachi Review), Vol 57, No 2, p 3-7, February, 1975. 5 fig, 11 ref.

Descriptors: *Instrumentation, *Waste water treatment, *Automation, *Control systems, Sewage treatment, Water treatment, Computers, Treatment facilities, Tertiary treatment.
Identifiers: *Japan.

Recent trends of instrumentation, control, and automation systems for waste water treatment are described. The establishment of a better sewage systems in Japan is urgently needed, with advanced treatment of sewage in large cities necessary because of the increasing populations of these cities. An effective reutilization of waste water is required, and may be accomplished by the establishment of different water lines for different types of water usage. For better control in waste water treatment plants, the concept of a hierarchical system should be employed, in which all controlling units for individual steps in water treatment are interrelated. The use of a computer is essential for this control system. The advantages of such a system are the high reliability and flexibility of the control system in cases of partial malfunctionings of treatment units. Another advantage is the high efficiency in controlling waste water treatment, particularly for large scale treatment plants. (Katayama-FIRL)
W76-00604

WATER MONITORING STATIONS,
Honeywell, Inc., Minneapolis, Minn.
For primary bibliographic entry see Field 5A.
W76-00605

MEASUREMENT OF POWER INPUT IN FLOCCULATION,
Visvesvaraya Regional Coll. of Engineering, Nagpur (India).
For primary bibliographic entry see Field 5F.
W76-00608

USING HYDROGEN PEROXIDE FOR POLLUTION CONTROL.
Water and Sewage Works, Reference Number, p 186-188, April 30, 1975. 5 fig, 7 tab.

Descriptors: *Waste water treatment, *Water pollution control, *Odor, *Activated sludge, Physical properties, *Density, Aqueous solutions, Oxygen.
Identifiers: *Hydrogen peroxide, Mixed liquor suspended solids.

The compound hydrogen peroxide (H2O2) has several applications in pollution control. It has been used for odor control, reduction of bulking in the activated sludge process, for better settling of the mixed liquor suspended solids, and for the addition of oxygen to waste. Hydrogen peroxide itself is not a pollutant and leaves no toxic residues. Because an increasing number of municipalities and industries are utilizing this compound, some of its important physical properties are described. Tables reproduced from the FMC Corporation book entitled 'Hydrogen Peroxide Physical Properties Data Book' provide information on: physical properties, measured in density of aqueous hydrogen peroxide solutions at zero degrees centigrade; physical properties measured in density of aqueous hydrogen peroxide solutions at 25 and 50 degrees centigrade; weight percent, mole fraction conversion and average molecular weight for hydrogen peroxide-water solutions; density of aqueous hydrogen peroxide solutions in degrees Baume; and the composition of particular decomposition products. (Kramer-FIRL)
W76-00616

CORROSION CONTROL BY CATHODIC PROTECTION,
E. G. Field.
Water and Waste Treatment, Vol 13, No 5, p 14-15, May, 1975. 1 fig, 1 ref.

Descriptors: *Corrosion control, Waste water treatment, *Treatment facilities, *Corrosion, *Cathodic protection, Pipelines, Tanks, Storage tanks, Water analysis.

Uses of cathodic protection for corrosion control in various areas of a treatment facility are described. Steel which is in contact with near neutral electrolyte is almost always subject to electro-chemical corrosion. Because current is generated where a difference in potential between two areas exists, corrosion is instigated at these anodic areas. The most effective way to completely inhibit this corrosion is to provide a current flow so as to prevent dissociation. Cathodic protection has been applied to pipelines laid in soils where other influences enhance the corrosion problem. It has also been used for buried external surfaces of storage tanks where coating is difficult. The United Kingdom Water Industry has not used cathodic protection for inhibiting corrosion on the internal surfaces of treatment tanks; in the United States, however, most treatment plants are painted and then cathodically protected to extend the length of the coating. Choices of cathodic protection system are sacrificial anode or impressed current and may be based on water analysis, including oxygen content, presence of chloride, pH value, and total dissolved solids; on plant operation, including temperature and agitated and quiescent zones; and, on the history of corrosion in particular areas of that individual facility. (Kramer-FIRL)
W76-00619

SPECIFICATIONS FOR GRANULAR FILTER MEDIA,
University Coll., London (England).
K. J. Ives.
Effluent and Water Treatment Journal, Vol 16, No 6, p 297-305, June, 1975. 7 fig, 1 tab, 8 ref.

Descriptors: *Filtration, *Filters, *Waste water treatment, *Water treatment, Standards, Particle shape, Particle size, Sands, Sieves.
Identifiers: Granular filter media specifications.

The use of coal, pumice, plastics, ceramics, garnet, ilmenite, alumina, and magnetite as filter media instead of sand, makes it desirable to compose a British Standard for granular filter media and to agree on methods used for testing filter media. A basis for a filterability test could be the Filterability Number F, which relates head loss, filter rate, average quality of filtrate during testing, quality of influent, and duration of test. The lowest value of F represents the best filterability. The use of sieves is the most practical grain sizing technique. Desirable size depends on the characteristics of the suspension to be filtered. Sieve size can be specified by the Hazen effective size. Shape can be defined in terms of sphericity: hydraulic diameter divided by sieve size. Sphericities of less than 0.6 would be unacceptable, since the grains would be too flaky and would settle in an unisotropic manner, resulting in rapid clogging.

No unique optimal density exists. The density should be greater than that of water. An upper density limit is imposed by the conditions necessary for backwashing (greater density requires smaller size). Durability standards should relate to performance of the saturated media. The media should be whole grains, not cemented agglomerates. Solubility can be specified in terms of dissolution in acid. Leachate specifications may be based on World Health Organization International Standards for Drinking Water. Since surface physico-chemical properties cannot be significantly altered, it is not necessary to formulate specifications. Fall velocity does not need to be specified as it depends on the already specified parameter of size, shape, and density of the grains. (Orr-FIRL)
W76-00622

FOCUS-COMPREHENSIVE WATER RESOURCES MANAGEMENT,
URS Corp., New York.
For primary bibliographic entry see Field 5G.
W76-00623

OPERATION OF SEWER AND DRAINAGE SYSTEMS (BETRIEB VON KANALISATIONS- UND ENTWAESSERUNGSANLAGEN),
B. Frechen.
Technische Mitteilungen, Vol 68, No 5, p 164-166, May, 1975.

Descriptors: *Sewers, *Sewerage, *Monitoring, *Cleaning, Operation, Maintenance, *Waste water treatment, Sewage treatment.
Identifiers: Television inspection, Sludge collector buckets.

The monitoring, scavenging, operation, and maintenance of sewer and drainage systems are described. Sewer systems should be inspected after completion and should be regularly if not annually monitored by personal inspection or by cameras or closed circuit television. Cleaning is best accomplished by means of a high-pressure water jet. Sewer connections are scavenged by sludge suction or by emptying the collector buckets. It is suggested that sewer sections with multiple damages be replaced rather than repaired for economic reasons. It was also recommended that all monitoring, cleaning, and maintenance operations should be performed according to a fixed schedule. (Takacs-FIRL)
W76-00626

NATION'S CAPITAL FACES CRITICAL WATER PROBLEM.
Civil Engineering, ASCE, Vol 45, No 6, p 58-61, June, 1975. 3 fig, 2 tab.

Descriptors: *Potable water, *District of Columbia, *Water quality control, Water distribution(Applied), Water management(Applied), Estuaries, Environmental effects, Treatment facilities, Costs.
Identifiers: Potomac River, Blue Plains Treatment facility, Funding, Washington(DC).

An overview of problems in water quality in the Washington, D. C. area is presented. In the past twelve years, 14 studies were conducted on how to store high flows for summer use and for flushing the estuary, whether or not to build dams and reservoirs to regulate flow, and how to treat the polluted estuary water of the Potomac River. Problems are bureaucratic as well as environmental. The area is owned by four states and the District of Columbia, which causes delay in any administrative decisions. Dams have been opposed because of land acquisition problems in populated areas. One estuary study is underway, whereby a one mgd demonstration plant will be built at the site of the Blue Plains Treatment plant to evaluate the possibility of making the polluted estuary water potable. While the Blue Plains facility has been expanded and improved in its tertiary stages, the system has had funding problems which have slowed its upgrading. Another new treatment plant that had been scheduled to be built, a 60 to 123 mgd facility in Dickerson, Maryland, has also had funding difficulties and opposition from environmentalists. A pessimistic feeling was stated about the overall progress in public water treatment for the Middle Atlantic Region by the Interstate Commission for the Potomac River Basin. (Kramer-FIRL)
W76-00627

THE FEDERAL CONSTRUCTION GRANT PROCESS FROM A (BILENE) TO Z (ANESVILLE),
Environmental Protection Agency, Washington, D.C. Office of Water Program Operations.
For primary bibliographic entry see Field 5G.
W76-00629

FINLAND'S CLEANUP CAMPAIGN,
For primary bibliographic entry see Field 5G.
W76-00631

LINING OF STORAGE RESERVOIRS AND LAGOONS--THE LATEST TECHNIQUES IN INSTALLATION AND JOINTING,
For primary bibliographic entry see Field 8G.
W76-00632

HIGHER PROFITS VIA ADVANCED INSTRUMENTATION,
Liptak Associates, Stamford, Conn.
B. G. Liptak.
Chemical Engineering, Vol 82, No 13, p 152-158, 160, 162, June 23, 1975. 9 fig, 2 tab, 16 ref.

Descriptors: *Waste water treatment, *Treatment facilities, *Control systems, *Instrumentation, Cost-benefit analysis, Costs, Industrial water, Municipal water.
Identifiers: *Advanced control systems.

In most chemical process plants, it is possible to increase production by about 20% by updating the instrumentation. A waste water treatment plant is considered in the example given but the approach used for systems evaluation and cost-benefit analysis can be applied to any other type of plant. Each of the main unit-operations found in a typical industrial or municipal waste water treatment plant is briefly reviewed with respect to instrumentation. The purposes of control systems are described and the traditional methods of instrumentation are compared with the capabilities of more- advanced control systems. Advanced controls include feedforward, multivariable, adaptive or optimizing systems. Before evaluating advanced controls, the conventional loops must be fully utilized. Whenever a new control strategy is suggested, a cost- benefit analysis should be performed. This analysis should identify the economical and other benefits to be gained from the new control system, and in addition should present the associated capital and operating costs. (Orr-FIRL)
W76-00635

DESALTERS SOW SEEDS FOR SAUDI INDUSTRY.
For primary bibliographic entry see Field 3A.
W76-00636

A STRATEGY FOR WATER POLLUTION CONTROL IN BRITAIN,
M. W. Askew.
Water and Pollution Control, Vol 113, No 8, p 16-18, August, 1975. 2 fig, 2 tab, 7 ref.

Descriptors: *Waste water treatment, *Sewage treatment, *Water resources, *Administration, *Conferences, Management, Planning, Biological treatment, Tertiary treatment, Water pollution control.
Identifiers: Physico-chemical treatment, *Great Britain.

A synopsis of the Annual Conference of the Institute of Water Pollution Control held at Scarborough, England, is given. This conference provided the first opportunity for a national discussion of the major reorganization of administration of water resources in England and Wales which became effective in April of 1974. The Water Act 1973 transferred the overall responsibilities for water resources to nine regional water authorities in England and a National Water Development Authority in Wales. The first session of the conference discussed corporate management for water authorities. Corporate management was defined as the management organization and structure of an authority necessary fr comprehensive planning and implementation of the use of its resource to achieve its aims. A paper entitled 'Water Resource Planning' identified the role of the water resources planner as developing long-term strategies which would meet multiple objectives at minimal cost. Future prospects of water authorities were dealt with in two papers on 'Operations in Regional Water Authorities, and 'Scientific Services in Regional Water Authorities.' Distinctions were made between physico-chemical treatment of raw sewage and physico-chemical methods for tertiary treatment. Two physico-chemical and biological sewage treatment pilot plants under construction as part of an advanced waste treatment project for NATO were also discussed. (Orr-FIRL)
W76-00638

A HISTORY OF SEWAGE WORKS' MACHINERY,
J. D. Cargill.
Water Pollution Control, Vol 74, No 4, p 430-454, 1975. 9 fig, 127 ref.

Descriptors: *Waste water treatment, *Sewage treatment, Treatment plants, Equipment, Pumps, Screens, Aeration, Sludge treatment, Centrifuges, Filters, Dewatering, History.

A history of the machinery associated with sewage treatment facilities is presented. Since the development of this equipment reflects the development of treatment methods, a review of the developing processes is also presented. The principal methods employed in the nineteenth century were irrigation, filtration and chemical precipitation. Biological processes were developed late in the nineteenth century. By the 1930's, most of the equipment available today had been developed; many improvements have been made during the last forty years. Descriptions are given of machinery that had actually been used in practice from 1840 to mid-1930. Sewage works' machinery can be divided into three broad groups: pumps, screens, detritus removal and scrapers that are used irrespective of the type of treatment; equipment associated with biological processes, such as distributors and aeration equipment; and, the machinery associated with sludge treatment, such as centrifuges, vacuum filters, and filter belt presses. (Orr-FIRL)
W76-00639

A CONTINUOUS GARGANTUAN TASK FOR SEVERN TRENT,
Severn Trent Water Authority (England).
For primary bibliographic entry see Field 5A.
W76-00640

THE EFFECT OF FINITE CHANNEL WIDTH ON CONCENTRATION POLARISATION REVERSE OSMOSIS UNDER LAMINAR FLOW CONDITIONS,
Birmingham Univ. (England). Dept. of Chemical Engineering.
For primary bibliographic entry see Field 3A.

W76-00642

OTTAWA PLAYS KEY ROLE IN TECHNOLOGY TRANSFER,
Environmental Protection Service, Ottawa, (Ontario).
A. B. Redekopp.
Water and Pollution Control, Vol 113, No 8, p 6, 35, August, 1975.

Descriptors: *Training, *Professional personnel, *Water pollution control, *Canada, Conferences, Waste water treatment, Industrial wastes, Municipal wastes, Treatment facilities.
Identifiers: *Technology transfer.

The development of training packages, courses and seminars for personnel involved in the water pollution control field by the Training and Technology Transfer Division (Water) and the Environmental Protection Service in Canada is described. In the Maritime Provinces, a program for waste water treatment plant operators has been designed to train those plant operators in the field as well as new student operators. The format is an audio-visual unit (Slides and tapes) with a printed workbook. Additionally, three-day operator training programs have been successfully implemented for extended aeration plant (Package plant) operators. For the pulp and paper industry as well as the petroleum refinery industry, special three-day seminars have been conducted. These are designed for regulatory staff employed both federal and provincial governments and discuss the various unit processes involved in the particular industry. Proceedings from the pulp and paper session have already been published and proceedings of the petroleum refinery session are to be published in the next few months. Discussions are related to industrial regulations and guidelines pertaining to current waste water treatment technology. Much emphasis has been placed on these seminars and conferences by the Environmental Protection Service because the individual plant managers in the typical Canadian small industrial operation does not have the time on a weekly basis to study new information. However, most managers do have the opportunity to attend these specizl seminars to focus on an important area of concern to their specific field of water pollution control. (Kramer-FIRL)
W76-00643

STUDIES ON FLOC-FORMING SUBSTANCES IN ACTIVATED SLUDGE. II. FLOC-FORMING ACTION BY THE VISCOUS SUBSTANCE EXTRACTED FROM ACTIVATED SLUDGE BY ALKALINE SOLUTION. (IN JAPANESE),
Gifu College of Pharmacy, (Japan).
T. Sato, and Y. Ose.
Eisei Kagaku, Journal of Hygienic Chemistry, Vol 21, No 2, p 55-59, 1975. 7 fig, 9 ref.

Descriptors: *Activated sludge, *Flocculation, *Acidity, E coli, Analytical techniques, Separation techniques, *Waste water treatment.
Identifiers: *Floc-forming abilities, Alkaline solution extraction.

An investigation was made on floc-forming substances in activated sludge. Highly viscous substances were extracted from activated sludge 2 N and 0.1 N sodium hydroxide solution. Their abilities to form flocs were observed. Both of these alkaline extracts were seen to flocculate kaolin and E. coli suspensions at a pH below 3, but not near the neutral pH of 7, which is within the flocculating range for activated sludge. Because the substance extracted from activated sludge was insoluble in a strong acidity range, it was postulated that a correlation may exist between acid insolubility and flocculation. (Kramer-FIRL)
W76-00645

ORGANIC RESIDUE IN RECYCLED EFFLUENT, PART II,
Utah State Univ. Logan.
V. D. Adams, E. J. Middlebrooks, and P. D. Nance.
Water and Sewage Works, Vol 122, No 7, p 98-99, July, 1975.

Descriptors: *Organic compounds, *Chlorination, Analytical techniques, *Water resue, Effluents, Recycling, Public health, Water pollution sources, Potable water.
Identifiers: Chlorine residual.

There has been much concern abouth the hazard of consuming recycled water because of the chlorinated organic compounds which may be found. An investigation was conducted to study liquids resulting from the use of chlorine as a disinfectant. Although the present study involved reuse of waste water treatment effluents for flushing purposes, and not for human consumption, data should be applicable to other chlorination uses. Material was isolated from recycled effluents by extraction techniques and was found to be a complex mixture, consisting mainly of saturated chlorinated fatty acids. Lipids were present in feces in a quantity significant enough to result in such saturated chlorinated fatty acids, due to a conversion process by free radical chlorination. The rate of accumulation of these chlorinated fatty acids is directly related to the concentrations of lipids added to the system and to the free chlorine maintained in the recycled effluent. Therefore, it is useful to determine the level of organic carbon acceptable in the recycling system so that the bactericidal and virucidal properties of chlorine are not impeded. This will establish a minimum level for acceptable free chlorine residual for the recycled effluent. (Kramer-FIRL)
W76-00646

THE REVOLUTION IN WATER MANAGEMENT,
For primary bibliographic entry see Field 5G.
W76-00648

PILOT PLANT OPTIMIZATION OF PHOSPHORIC ACID RECOVERY PROCESS,
Lancy Labs., Inc., Zelienople, Pa.
L. E. Lancy, F. A. Steward, and J. H. Weet.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-015, April 1975. 27 p, 3 fig, 7 tab, 2 ref. 1BB036;ROAP 21AZO; Task 21, S802637-01.

Descriptors: Industrial wastes, *Waste water treatment, Waste treatment, *Ion exchange, *Water reuse, *Pilot plants, Waste water disposal, Water pollution control.
Identifiers: *Waste recovery, Nonferrous metal industry, Aluminum fabricating wastes, Bright finishing wastes, *Phosphoric acid wastes.

A pilot plant study was carried out which demonstrated the effectiveness and economic feasibility of a unique ion exchange process referred to as 'acid retardation' for purifying spent phosphoric acid used in bright finishing aluminum parts. A continuous ion exchange system was employed to separate the aluminum contamination from a spent phosphoric acid waste obtained from a manufacturing plant. The anion resin accomplishes the separation by retarding the phosphoric acid as the processing solution flows through the bed. The aluminum remains in the waste solution and passes out of the column in the effluent. The acid is then eluted from the bed with water, eliminating the use of chemicals which are needed to regenerate the resin in conventional ion exchange systems. (EPA)
W76-00676

STORM WATER MANAGEMENT MODEL: DISSEMINATION AND USER ASSISTANCE,
University City Science Center, Philadelphia, Pa.
For primary bibliographic entry see Field 5G.
W76-00678

SPECIFICATIONS FOR MATERIALS RECOVERED FROM MUNICIPAL REFUSE,
National Center for Resource Recovery, Inc., Washington, D. C.
H. Alter, and W. R. Reeves.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-034, May 1975. 109 p, 25 tab, 105 ref, append. 1DB314; ROAP 06AKO; Task 02. 801622.

Descriptors: Specifications, Reclamation, Solid wastes, Materials, Municipal wastes, Separation techniques.
Identifiers: Solid waste separation, Refuse materials recovery, Secondary materials, *User specifications, *Materials specifications.

Specifications are presented that represent first efforts to define uniform qualities of materials separated from municipal solid waste in resource recovery processing plants for subsequent sale and use. The establishment of specifications adds value to outputs and promotes acceptance by users as a result of providing a basis for quality assurance. Recoverable materials investigated are: folded newsprint and corrugated paper, ferrous metals, aluminum, other nonferrous metals, glass cullet, inorganic fines, mixed organics (for fuel). Indications of possible contamination were obtained on a limited scale by reviewing literature, visiting plants, and coordinating with the activities of a companion research grant which included processing pilot quantities of municipal solid waste from several cities. The resulting target specifications were written as goals for plant design; the targets seem achievable with existing technology. The likelihood of these target specifications being accepted was checked by reviewing them with officials of appropriate companies and trade associations. (EPA)
W76-00684

RAINFALL-RUNOFF RELATIONS ON URBAN AND RURAL AREAS,
Michigan Univ., Ann Arbor. Dept. of Civil Engineering.
For primary bibliographic entry see Field 2A.
W76-00685

DISPOSAL AND UTILIZATION OF WASTE KILN DUST FROM CEMENT INDUSTRY,
Southern Reserach Inst., Birmingham, Ala.
T. A. Davis, and D. B. Hooks.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-043, May 1975. 54 p, 7 fig, 5 tab, 71 ref, append. SORI-EAS-74-237. 1BB036; ROAP 21 BET; Task 11 R-801872.

Descriptors: *Portland cements, Waste disposal, Dusts, *Waste treatment, Alkali-aggregate reactions, Fertilizers, Industrial wastes, Potassium, Inorganic compounds, Air pollution, *Recycling.
Identifiers: *Dust control.

A survey that included 60% of the cement-manufacturing plants in the United States was made to determine the fate of dust collected from the gases emanating from cement kilns. Because of high alkali content, large quantities of the dust cannot be returned to the cement-making process. A survey was made of the literature in the United States and Europe pertaining to handling, reclaiming, and utilizing the collected dust. Abstracts of 71 references are included in the Appendix. Acid neutralization capacity and potash content make the dust valuable for application to farmland, and the potential market for agricultural use alone could consume all of the waste dust that is now being discarded. (EPA)
W76-00686

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES, VOLUME I-SUMMARY,
Dayton Univ. Ohio Research Inst.
For primary bibliographic entry see Field 5E.
W76-00687

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES. VOLUME II - MUNICIPAL SLUDGES,
Dayton Univ. Ohio. Research Inst.
For primary bibliographic entry see Field 5E.
W76-00688

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES, VOLUME III - UTILITY COAL ASH,
Dayton Univ. Ohio. Research Inst.
For primary bibliographic entry see Field 5E.
W76-00689

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES. VOLUME IV - MUNICIPAL INCINERATOR RESIDUES,
Dayton Univ. Ohio. Research Inst.
For primary bibliographic entry see Field 5E.
W76-00690

SEWERAGE SYSTEM MONITORING AND REMOTE CONTROL,
Detroit Metro Water Dept., Mich.
T. R. Watt, R. G. Skrentner, and A. C. Davanzo.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-020, May 1975. 183 p, 89 fig, 8 tab, 57 ref, 2 append. 1BB034; ROAP 21-ASY; Task 46. 4-MICH-1/11020 FAX.

Descriptors: *Combined sewers, *Monitoring, *Remote control, Remote sensing, Telemetry, Routing, Overflows, Sampling, Interception, Data acquisition, Cost comparisons, Michigan, *Storm runoff, Urban runoff, *Sewerage.
Identifiers: *Detroit(Mich), *Waste water storage, Monitoring equipment evaluation, Overflow monitoring, In-system storage, Sewer system operations.

This is the final report of a demonstration project to apply sewer system monitoring and remote control techniques to reduce pollution of receiving waters from combined sewer overflows and storm wastewater pumping. The monitoring system includes telemetering rain gages, sewer level sensors and overflow sensors and a central computer and data logging facility. Wastewater pump stations and certain key regulators were remotely controlled to allow in-system storage. Remotely controlled sluice gates were installed in a sewer to study the feasibility of using dry weather flow to flush sewers. A detailed discussion and evaluation are included of the monitoring and remote control equipment, installation details, the concept of in-system storage, and the operation of the system based on an 18-month study period. Detroit has found that many of the larger sewers are not used to capacity during storms. Utilization of system monitoring and remote control techniques has resulted in a significant reduction in the volume of combined sewer overflows and storm wastewater pumping as well as reduced operation and maintenance costs. Results of a combined sewer sampling program are being used to establish priorities for future system modifications. (EPA)
W76-00691

DEMONSTRATED TECHNOLOGY AND RESEARCH NEEDS FOR REUSE OF MUNICIPAL WASTEWATER,
SCS Engineers, Long Beach, Calif.
C. J. Schmidt, and E. V. Clements, III.
Available from the National Technical Information Service, Springfield, Va. Environmental Protection Agency, Report EPA-670/2-75-038, May 1975. 338 p, 37 fig, 50 tab, 340 ref, 7 append. ROAP 21-ASB - Task 011 1BB033.

Descriptors: *Water reuse, *Waste water treatment, *Municipal water, Water conservation, *Recycling, Sites, Water resources, Cooling water, Water supply, Attitudes, Industrial water, Irrigation.
Identifiers: *Reuse technology, Domestic reuse, Recreation reuse.

This survey identified 358 sites at which direct reuse of municipal wastewater was being practiced. Detailed data were gathered on volume, effluent quality, treatment, reliability and economics. Direct reuse of municipal wastewater was not widespread; it accounted for less than 2 per cent of this nation's water use in 1972. Irrigation and industrial cooling account for virtually all of this reuse. Only three sites practice reuse for recreational lakes, and one for nonpotable domestic use. Potable reuse is not presently practiced. General quality standards could not be derived for any category. In fact, water which is substandard according to published criteria is being successfully used in many reuse situations by fitting the water quality to the specific local condition. Overall economic analysis was also difficult. Storage and distance between supplier and consumer were more important considerations than quality and treatment. In general, the supplier undercharged the consumer because reuse was viewed as an inexpensive disposal technique. There is significant potential for an increase in reuse of wastewater in all categories; increased publicity concerning successful reuse is required to initiate this increase. (EPA)
W76-00692

ADVANCED AUTOMATIC CONTROL STRATEGIES FOR THE ACTIVATED SLUDGE TREATMENT PROCESS,
Systems Control, Inc., Palo Alto, Calif.
J. F. Petersack, and R. G. Smith.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-039. May 1975. 154 p, 33 fig, 11 tab, 14 ref, 3 append. 1BB043; ROAP 21ASC; Task 007 R800356.

Descriptors: *Automatic control, *Waste water treatment, Dissolved gases, Oxygen, Sludge treatment, *Activated sludge, Instrumentation, Computers, Data acquisition, Suspended solids, *California, Sewage treatment.
Identifiers: *Palo Alto(Calif), Badger meter respirometers, Astro ecology TOC analyzer, IBM system/7, Keene suspended solids.

Results of a demonstration of the feasibility and benefits of applying several advanced wastewater treatment control strategies in an operational treatment plant using a digital computer are presented. The work was conducted in a full size (35 MGD capacity) secondary treatment plant at Palo Alto, California. Control strategies tested were for the secondary treatment portion of the process and involved regulation of aeration tank dissolved oxygen (DO) and food for microorganism ratio (F/M). Two variations of F/M ratio control were evaluated using respectively air flow and a direct measurement of sludge respiration with an on-line respirometer to estimate food (BOD). An extensive data collection program was incorporated which allowed detailed statistical evaluation of each control algorithm with regard to performance, effluent quality impact, operating costs, and reliability. Comparison was made to similar data collected during benchmark manual operation tests. Overall results indicate digital control using advanced control concepts is feasible and that demonstrable improvements in effluent quality are obtained. Direct operating cost savings in the form of an 11% reduction in air use was also shown for DO control. (EPA)
W76-00693

BIOLOGICAL TREATMENT OF COMBINED SEWER OVERFLOW AT KENOSHA, WISCONSIN,
Envirex Inc., Milwaukee, Wis.
R. W. Agnew, C. A. Hansen, M. J. Clark, O. F. Nelson, and W. H. Richardson.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-019, April 1975. 246 p, 46 fig, 18 tab, 31 ref, 4 append. 1BB034; ROAP 21-ASY; Task 139 11023 EKC.

Descriptors: *Sewage treatment, *Waste water treatment, Activated sludge, Runoff, *Biological treatment, Overflows, *Wisconsin, *Combined sewers, Water pollution, *Surface runoff.
Identifiers: *Contact stabilization, *Kenosha(Wis), Dual use, Dry/wet weather treatment, Combined sewage, Combined sewer overflow.

A description is presented for the design, construction, operation and two-year evaluation of a biological process used for the treatment of potential combined sewer overflow. A 75,700 cu m/day (20 mgd) modified contact stabilization process was constructed on the grounds of an existing 87,055 cu m/day (23 mgd) conventional activated sludge plant at a total cost of 1.1 million dollars. The demonstration system consisted of pumping facilities, the conversion of an unused flocculation basin into a grit basin, construction of a contact tank and stabilization tank, installation of a final clarifier and all associated yard piping and automatic control equipment. The demonstration system's raw sewage pump and clarifier were used by the dry weather plant when the demonstration system was not in use. Results from the evaluation program proved the demonstration system to be a feasible concept for the treatment of potential combined sewer overflow. The system was operated and evaluated during 49 runs in which 681,300 cu m (180,000,000 gal.) of potential overflow was treated. Based on these tests, expected removal efficiencies for suspended solids, BOD, and TOC are 90%, 85%, and 76%, respectively. Operating costs for running the system 300 hours per year are estimated at 3.567cents/cu m (13.5cents/1000 gal.). An additional benefit derived from the demonstration system was improved removal efficiencies by the dry weather plant through utilization of the demonstration system facilities. (EPA)
W76-00694

URBAN STORMWATER MANAGEMENT MODELING AND DECISION-MAKING,
Florida Univ., Gainesville. Dept. of Environmental Engineering Sciences.
J. P. Heaney, W. C. Huber, H. Sheikh, M. A. Medina, and J. R. Doyle.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-022, May 1975. 185 p, 37 fig, 47 tab, 95 ref. 1BB034 ROAP:ATA Task:015 802219 (11023 GSC).

Descriptors: Water storage, Simulation analysis, Rainfall, Runoff, Vegetation, Waste treatmen, Erosion control, Optimization, Cost analysis, *Combined sewers, *Water pollution, Computer programs, Decision making, *Computer models, *Storm drains, *Storm water, *Cost sharing.
Identifiers: Lancaster(Pa), *Urban stormwater management model.

The purposes were to test, refine and augment the capabilities of the EPA Storm Water Management Model (SWMM), and to develop decision-making capabilities for use in the study of urban stormwater runoff problems. With regard to the SWMM the numerous programming refinements were introduced to provide reliability and flexibility. A sediment prediction capability has been incor-

porated directly into the SWMM. Detailed testing was conducted in Lancaster, Pennsylvania to demonstrate the ability of the SWMM to describe the relatively complex phenomena occurring in an urban catchment. A systematic procedure is presented for examining the stormwater management problem in the broader context of urban water resources management. Related standards for flood control and drainage, street and parking lot design, etc., are reviewed and suggestions presented regarding modifications in practices which would ameliorate stormwater problems. An optimization procedure is described which addresses the related problems of finding efficient and equitable control strategies. Lastly, the use of the SWMM for preliminary hydraulic design of sewer systems is described. (EPA)
W76-00695

AN INTEGRATED POWER PROCESS MODEL OF WATER USE AND WASTE WATER TREATMENT IN CHLOR-ALKALI PRODUCTION,
Houston Univ., Tex. Dept. of Quantitative Management Science.
F. D. Singleton, Jr., J. A. Calloway, and R. G. Thompson.
Water Resources Research, Vol 11, No 4, p 515-525, August, 1975. 11 fig, 4 tab, 22 ref.

Descriptors: *Waste water treatment, *Costs, *Water quality standards, *Industrial plants, Water pollution, Waste water(Pollution), Model studies, Economics, Water treatment, Water quality control, Water utilization, Chlorine, Mercury.
Identifiers: Mercury cell plants, Diaphram cell plants, *Chlor-Alkali production.

An economic evaluation was made of the effects of increasingly restrictive waste water effluent standards and higher costs of water withdrawals on resource use, waste discharges, and costs of producing chlorine and caustic. Mercury and diaphragm cell methods of production were studied for large modern plants at the design stage. Zero discharges of total solids increased production costs 5.6% in diaphragm cell plants and 12.1% in mercury cell plants. Zero discharge restrictions of mercury may only be accomplished by use of diaphragm cells. (Robinett-Arizona)
W76-00707

ANIMAL WASTE MANAGEMENT WITH POLLUTION CONTROL.
For primary bibliographic entry see Field 5G.
W76-00714

NITRIFICATION RATE IN BIOLOGICAL PROCESSES,
Metcalf and Eddy, Inc., Boston, Mass.
C. S. Huang, and N. E. Hopson.
Journal of the Environmental Engineering Division, American Society of Civil Engineers, Vol 100, No EE2, p 409-422, April, 1974. 3 fig, 78 ref, 2 append.

Descriptors: *Nitrification, Rates, Sanitary engineering, Biological properties, Laboratory tests, Reviews, Bibliographies.
Identifiers: *Reaction rate equation.

A review of literature concerning the nitrification process shows a diverse opinion as to the reaction rate equation for the process. Four reaction rate equations are reviewed and an experimental study performed to determine the correct equation is described. From the initial ammonia nitrogen concentration and the contact time studies the nitrification process was shown to follow a zero-ordered reaction. This conclusion is in disagreement with some of the reviewed literature. However, many experimental and evaluation problems may cause researchers to assume first-order reaction rates in their nitrification studies. The expression 'percent removal' or 'percent remaining' usually used in BOD reactions is not a meaningful way to evaluate the reaction rate. A small change in pH caused by the H+ ions released from the nitrification process also may affect the results of nitrification studies. (Skogerboe-Colorado State)
W76-00738

WATER AND ENERGY REQUIRED TO OPERATE COAL GASIFICATION FACILITIES AND WASTE WATER TREATMENT REQUIREMENTS,
El Paso Natural Gas Co., Tex.
For primary bibliographic entry see Field 6D.
W76-00751

ADVANCED PROCESSES: WATER DESALTING AND REUSE,
Arizona Univ., Tucson. Dept. of Civil Engineering and Engineering Mechanics.
R. A. Sierka.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 206-230. 3 fig, 6 tab, 12 ref.

Descriptors: *Waste water treatment, *Recycling, *Water reuse, *Desalination, *Water quality, *Biological treatment, Coagulation, Filtration, Flocculation, Oxidation, Reverse osmosis, Activated carbon, Industrial wastes, Municipal wastes, Semipermeable membranes, Waste water(Pollution), Water pollution, Water treatment, Sewage treatment, Tertiary treatment, Water conservation, Electrochemistry, Water chemistry, Inorganic compounds, Organic compounds, Nutrients, Suspended solids, Ozone, Chlorination, Ion exchange, Economics.

To upgrade polluted water to a quality level demanded by a potential user requires various degrees of treatment including the use of advanced treatment processes either singly or in combination. Process sequencing is of prime importance since the system's optimization often depends on previous pollutant removals. Described are advanced treatment processes for the 5 pollutant categories: (1) dissolved inorganics, (2) dissolved organics, (3) nutrient species, (4) suspended particulates, and (5) living matter. Reverse oxmosis or electrodialysis is used for (1, activated carbon adsorption, oxidation with ozone, or wet air oxidation for (2), coagulation and flocculation with metal coagulants with biological cellular uptake for phosphorous, or air stripping, ion exchange, breakpoint chlorination, and nitrification-denitrification for nitrogen removal for (3), straining, gravity separation, and granular media filtration for (4), and chlorination, ozonation, heat, and gamma radiation for (5). These operations can be synthesized into a process to produce renovated waters for reuse at any given quality level. Proper operation sequencing with single and multiple pollutant removal capabilities will provide an optimum design for both the economic and process standpoint. (See also W76-00745) (Robinett-Arizona)
W76-00756

POTENTIAL FOR AGRICULTURE UTILIZING WASTE HEAT FROM POWER PLANTS,
Arizona Univ., Tucson. Environmental Research Lab.
For primary bibliographic entry see Field 3C.
W76-00757

CITY WASTE WATER REUSE FOR NUCLEAR POWER PLANT COOLING,
Arizona Public Service Corp., Phoenix.
A. C. Rogers.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 304-319. 5 fig, 5 ref.

Descriptors: *Water supply, *Water requirements, *Nuclear powerplants, *Waste water treatment, *Water reuse, Water utilization, Lime, Electric power production, Water resources, Economics, Costs, Electric power, Energy, Cooling water, Cooling towers, Arid lands, *Arizona, Water conservation, Recycling, Water quality, Biological treatment, Chlorination, Water treatment, Filtration, Calcium compounds, Magnesium compounds, Silica, Phosphates, Ammonia, Nitrification.
Identifiers: Phoenix(Ariz), Cold lime treatment.

In using waste water for nuclear power plant cooling it is important to maintain calcium, magnesium, silica and phosphate at low levels for good condenser/cooling tower operation. A reduction in ammonia is important because of potential corrosion of certain metal alloys and for reliability and cost effectiveness of the overall waste water reclamation system. The effluent requires some chlorination initially, a treatment step comprising biological nitrification to remove most of the ammonia, then a one or two stage cold lime treatment. The two-stage lime treatment process uses lime addition in the first clarifier at a high pH to remove phosphate and calcium through formation of calcium hydroxyapatite. This treatment also removes magnesium and silica. In the second stage, the pH is lowered through the addition of CO_2, and soda ash which results in removal of reasonably pure calsium carbonate which can be recovered to supplement the lime addition. The cost of the water after processing is estimated to be in excess of $100 per acre-foot. (See also W76-00745) (Robinett-Arizona)
W76-00760

ENVIRONMENTAL COSTS FOR THE NAVAJO GENERATING STATION,
Salt River Project, Phoenix, Ariz.
G. E. Palomino.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975. p 320-344, 6 fig.

Descriptors: *Water quality, *Water reuse, *Environmental effects, *Air pollution, Electric power production, Waste water treatment, Recycling, Industrial wastes, Waste water(Pollution), Water pollution, Water treatment, *Airzona, Water conservation, Costs, Water requirements, Water supply, Arid lands, Ecology, Electric power industry, Water utilization, Environmental engineering, Coals, Smoke, Esthetics.
Identifiers: Brine concentrator, Lake Powell(Ariz), Environmental constraints, Navajo Generating Station(Ariz), Vertical tube evaporator.

The cost estimate for the 2,250,000 kilowatt coal-fired Navajo Generating Station, located near Page, Arizona, now exceeds 650 million dollars. When the project was implemented, environmental design criteria were developed for 3 major areas of concern: air quality, water quality, and aesthetic considerations. Air quality protection includes NO sub x control, a particulate removal system, an ash handling system, a fly ash system, a coal handling system (which incorporates dust-suppression systems,coal conveyars enclosures,and a dust collection system) and a S02 removal system. Water for the plant comes from Lake Powell and none is returned. All plant waste water is disposed of by discharge to essentially impermeable evaporation ponds. A sanitary sewer system for collection of oily wastes, surface drainage, and equipment drainage along with a water reclamation system has been installed at this plant. The reclamation system is a vertical tube evaporator which treats some of the cooling tower blowdown and can reclaim up to 90% of the input. The most important impact of aesthetic consideration was on the design and construction of the Lake Powell pumping station. (See also W76-00745) (Robinett-Arizona)
W76-00761

DEVELOPMENT OF SEWER SYSTEMS.
Japan Environment Agency, Tokyo.
In: Water Pollution Control in Japan, p 32-33, May 1972. 1 tab.

Descriptors: *Sewerage, Drainage area, Legislation, Construction, Waste water treatment.
Identifiers: *Japan.

As of the end of fiscal year 1970 the rate of coverage of Japan's sewerage systems in terms of drainage area was only 22.8%. Due to the establishment of the 1970 environmental standards and the enforcement of a new City Planning Law, the need for accelerated construction of sewer systems necessitated a third five-year sewerage construction program formulated with an estimated total for the extension of sewer systems starting in fiscal year 1971. The drainage areas of sewer systems is scheduled to reach 38% of the total urban area by the end of this program. (Sandoski-FIRL)
W76-00762

STOCKHOLM THROUGH THE EYES OF THE SEWERAGE ENGINEER,
Stockholm Gas and Water-Works, (Sweden).
In: Vatten, Avlopp Water, Sewage Eau, Egouts, p 26-27, 1972.

Descriptors: *Sewerage, *Sewers, *Treatment facilities, Sewage disposal, Sewage treatment, Population, Waste water treatment.
Identifiers: *Stockholm, *Sweden.

At present the number of persons being serviced by Stockholm's sewage treatment facilities is more than 900,000 with an estimated one hundred thousand increase by the year 2000. The combined-type sewerage system for the area dates from 1868 and is the mainstay for the district. Since the mid-1950's the sewers have been constructed on the duplicate or separate system and arranged so that the sewage runs under gravity in the direction of the nearest lake. With the need for sewage treatment and the extension of populated limits, intercepting sewers were constructed and the pumping of sewage on a large scale initiated. Today there are approximately 130 sewage pumping stations within the confines of the city. (Sandoski-FIRL)
W76-00763

CONTINUOUS READING LOW RANGE TURBIDIMETER MODEL 1720.
For primary bibliographic entry see Field 7B.
W76-00764

DEHYDRATION OF URBAN SEWAGE SLUDGE BY FREEZING (TOSHI GENSUI ODEI NO TOKETSU DASSUI SHORI),
Radiation Center of Osaka Prefecture, Osaka (Japan). Research Inst.
T. Matsumura, Y. Kinugasa, and I. Toda.
Mizu Shori Gijutsu, (Water Purification and Liquid Wastes Treatment), Vol 13, No 5, p 1-6, May, 1972. 8 fig, 4 tab, 2 ref.

Descriptors: *Sewage sludge, *Sewage treatment, *Freezing, *Dehydration, Sludge treatment, Waste water treatment.
Identifiers: *Japan(Osaka), *Freezing-dehydration system, Precipitation pond, Precipitation speed.

The application of a freezing-dehydration system for use in treating urban sewage sludge has been tested in Japan. Samples from the Osaka sewage treatment plant were categorized as sludge from the initial precipitation pond, one-hour condensation excess sludge, and mixed sludge. Results show that the precipitation speed of sludge was increased greatly by this freezing-melting method. The precipitation speed of excess and mixed sludge did not change with freezing speeds; however, the initial precipitation pond sampling reacted more effectively under slower speeds. The feasibility of such a treatment system for urban use presently is outlawed to costs unless natural freeze and an effective use of liquid-gas gasification heat are employed. (Sandoski-FIRL)
W76-00765

DESIGN CRITERIA--WASTE TREATMENT PLANTS AND TREATMENT OF SEWER OVERFLOW,
Environmental Protection Agency, Springfield, Ill.
W. L. Blaser.
Water Pollution Control Technical Policy 20-24, Illinois Environmental Protection Agency, Sanitary Water Board, July, 1971. 25 p, 1 fig, 2 tab.

Descriptors: *Legislation, *Overflow, *Sewers, Sewerage, *Treatment facilities, Combined sewers, Infiltration, *Design criteria, Separated sewers, *Waste water treatment, *Illinois.

Pursuant to authority granted in Section 39 of the Environmental Protection Act and in the Illinois Pollution Control Board Rules and Regulations the design criteria in the treatment of sewer overflows must meet the following requirements. All system bypasses and overflows that are not absolutely necessary shall be eliminated or alternate facilities provided to insure adequate treatment of the overflows. New combined sewers are prohibited and existing combined sewer systems shall be controlled with overflow regulating devices adjusted to convey the maximum amount of combined flow to the treatment facilities. All infiltration to the sewer system shall be controlled to keep dry weather flow at design limits. (Sandoski-FIRL)
W76-00769

SEWAGE PURIFICATION DEVICE (OSUI JOKA SOCHI),
K. Kuramoto, K. Yoshimura, Y. Hirakawa, and H. Matsumoto.
Japanese Patent Sho 47-12392. Applied March 29, 1967. Issued April 17, 1972.

Descriptors: *Sewage treatment, *Treatment facilities, *Patents, Aeration, Aerobic conditions, Chemical precipitation, Disinfection, *Aerobic treatment, *Waste water treatment.
Identifiers: Japan, *Aerobic digestion.

A sewage purification system consisting of an aeration tank, two precipitation tanks, an aerobic digestion tank, and a sterilization tank has been patented. One large outer tank is separated into two sections by a partition. One section is segmented further into two sections by double walls which do not cut off the two segments completely. One is the aeration tank, and the excess sludge from this part over- flows into the next section when it gets above a certain level; the connecting section is a precipitation tank. When the water level of the supernatant liquid from the second precipitation tank rises above a certain level, it overflows into the sterilization tank. By transferring excess sludge from the aeration tank into its precipitation tank, the sludge concentration of the aeration tank is always maintained at a given level, preventing any lowering of aeration tank functioning. (Sandoski-FIRL)
W76-00770

SEWAGE SOLID SEPARATING DEVICE,
C. C. Laval, Jr.
Untied States Patent 3,701,425. Applied October 16, 1970. Issued October 31, 1972. Official Gazette of the United States Patent Office, Vol 903, No 5, p 1582, October 31, 1972.

Descriptors: *Sewage, *Solid wastes, *Separation techniques, Flow characteristics, *Patents, Equipment, *Waste water treatment.
Identifiers: Sewage solids, Sewage fluids.

A device for separating sewage solids from sewage fluids has been patented. The device is characterized by a variably dimensioned orifice for tangentially jetting a stream of fluid into a vortexing chamber supported in an upwardly spaced relationship with an accumulator for descending solids. A flexible closure member is extended across the orifice in the direction of the flow and is provided with a first surface against which fluids passing through the orifice impinge and a second surface against which fluids within the chamber impinge, whereby the effective dimensions of the orifice is varied in response to variations in the flow characteristics of the stream. (Sandoski-FIRL)
W76-00771

COMPACT SEWAGE TREATMENT APPARATUS,
R. D. Wetzel.
United States Patent 3,701,426. Applied November 18, 1971. Issued October 31, 1972. Official Gazette of the United States Patent Office, Vol 903, No 5, p 1582, October 31, 1972.

Descriptors: *Sewage treatment, Anaerobic bacteria, Sedimentation, Flotation, Filtration, Effluents, *Patents, *Waste water treatment.

A patent for a compact, compartmentalized sewage treatment apparatus housed in a single tank has been issued. Sewage discharged into the apparatus is progressively clarified byanaerobic bacterial deomposition, primary sedimentation and flotation, chemical attack to reduce coliform bacteria and BOD, and secondary sedimentation, flotation and filtration to highly clarify the effluent for discharge into water courses. (Sandoski-FIRL)
W76-00772

PROCESS AND PLANT FOR TREATING SEWAGE AND THE LIKE,
K. C. Ayers, and D. W. McAnaney.
Canadian Patent 912,716. Applied April 30, 1970. Issued October 17, 1972. Patent Office Record, Vol 100, No 42, p 4379, October 17, 1972.

Descriptors: *Sewage, Trickling filters, Lagoons, *Patents, *Sewage treatment, Dissolved solids, Suspended solids, Activated sludge, *Waste water treatment.

A process for the treatment of liquid containing biodegradable organic solids, as for example sewage, which combines desirable features of trickling filter and activated sludge systems and includes suitable apparatus has been patented. In this process, a liquid containing biodegradable solids is constantly recirculated from a sump or aerobic lagoon through a trickling filter, and effluent from the trickling filter is mixed with incoming raw sewage with agitation in the sump. The mixture is then retained in quiescent zones before overflow effluent is removed from the sump thus efficiently treating both settleable solids and dissolved solids contained in the sewage. (Sandoski-FIRL)
W76-00774

RATIONAL FORMULA NEEDS CHANGE AND UNIFORMITY IN PRACTICAL APPLICATION,
For primary bibliographic entry see Field 4A.
W76-00775

32-FOOT VERTICAL SHAFT BUILT WITH CONCRETE PIPE.
For primary bibliographic entry see Field 8G.
W76-00776

PENYBONT MAIN SEWER.
Civil Engineering and Public Works Review, Vol 67, No 796, p 1185, November, 1972. 1 fig.

Descriptors: *Sewerage, *Treatment facilities, Aeration, Population, Overflow, Flow, Settling basins, Waste water treatment.
Identifiers: Penybont(England), Storm water tanks.

The main units of treatment of the new Penybont, England sewer system include the main pumping station, the grit extraction and macerating plant, primary sedimentation tanks, the aeration system, secondary sedimentation tanks, and storm water tanks. The ultimate design population will be in the region of 180,000 persons with an anticipated trade flow in the order of 5.5 mgd. The peak design flow is anticipated to amount to approximately 108 mgd, and the storm separation device has been designed to accomodate varying overflow settings as development takes place. (Sandoski-FIRL)
W76-00777

TUNNELING MAKES RIVERSIDE INTERCEPTOR FEASIBLE,
Black and Veatch, Kansas City, Mo.
W. R. Condon.
Public Works, Vol 103, No 11, p 70-72, 104, November, 1972. 3 fig.

Descriptors: *Tunneling, *Sewers, *Interceptor sewers, Drainage water, Construction methods, Soils, Dewatering, Missouri River, Treatment facilities, Tunneling, *Missouri.
Identifiers: *St. Joseph(Mo).

A riverside interceptor sewer, which parallels the Missouri River near the outlet of existing combined sewers, for the collection and treatment of dry-weather waste water flow was constructed in St. Joseph, Missouri. In this interceptor system the dry-weather flow in the sewers is intercepted and conveyed to a treatment plant. Tunneling was used in the interceptor program in conjunction with the wood box construction method. With this type of construction, a shaft is built at each turning point in the sewer alignment, at each line manhole, and at each diversion structure. A tunneling shield is lowered into a shaft and used to excavate along the sewer alignment. Much of the soil was accreted and contained a variety of materials, including sand, clay, gumbo, and trash, loose rock and wood. A portion of the sewer was constructed in sand below the level of the Missouri River, and extensive dewatering was required. (Sandoski-FIRL)
W76-00778

MOLE MUNCHES THROUGH 4 MILES OF HARD ROCK.
Engineering News Record, Vol 189, No 17, p 18-19, October 26, 1972. 3 fig.

Descriptors: *Tunnels, *Tunneling, Treatment facilities, Tunneling machines, New York.
Identifiers: New York City, North River Pollution Control Project(NY).

The New York City River Water Pollution Control Project includes 13 miles of tunnels with five tunnel sections, and a 220 mgd treatment plant. Tunneling methods include the conventional shoot and muck, cut and cover, tunnel boring machines (TBMs), working under air, freezing, and combinations of these. Two TBM moles are being used on the Project: one, an 11-foot diameter mole in the south heading of a four mile tunnel; and the other, an 8.5-foot diameter mole in the north heading. The moles cut through the rock with strengths to 30,000 psi. The gage cutter with a 1-inch round bolt carbide insert provides endurance, lasting through 1000 feet. The bolt inserts are placed around the outside of the cutter head. Cutter disks with button carbide inserts are placed around the center of the cutter head. The smooth finish eliminates the need to concrete overbreak areas. (Sandoski-FIRL)
W76-00779

LOADER USED TO SPEED SEWER TUNNEL CONSTRUCTION.
Tunnels and Tunnelling, Vol 4, No 6, p 560, November/December, 1972. 2 fig.

Descriptors: *Tunnel construction, *Tunnels, Tunneling machines, Sewers, *Ohio.
Identifiers: Lucas County(Ohio).

A small four wheel drive skid-steer type Uniloader with a water-cooled diesel engine was used to speed sewer tunnel construction in Lucas County, Ohio. The old fashioned method of tunnel construction was used, the procedure consisting of drilling, shooting, mucking, and installing steel support rims and wooden lagging. Several modifications were made to better equip the Uni-loader for tunneling. A shovel point nose was fabricated onto a conventional bucket since a small loader pushing a standard half-yard bucket into heavy shot rock could be expected to have problems. A special steel box was rigged to the rear of the machine and loaded with 150 pounds of lead for extra counter weight. The air cleaner was replaced with an oil bath cleaner because of the dirty underground conditions. The diesel engine was equipped with a special scrubber-type catalytic muffler designed to reduce the amount of noxious gases emitted. The Uni-loader was used to carry rock, dynamite, drills, steel ribs and laggings, and concrete for the construction of a floor to maintain the pipeline at grade. (Sandoski-FIRL)
W76-00780

MINI TUNNELLING SYSTEM.
For primary bibliographic entry see Field 8H.
W76-00782

A GENERAL PLAN FOR THE URBAN DEVELOPMENT OF MOSCOW AND TASKS RELATED TO WATER HYGIENE AND SANITARY PROTECTION OF WATER RESERVOIRS (GENERAL' NYY PLAN RAZVITIYA MOSKVY I ZADACHI GIGIYENY VODY I SANITARNOY OKHRANY VOKOYEMOV),
S. H. Cherkinskiy.
Gigiyena i Sanitariya, Vol 37, No 16, p 16-20, 1972.

Descriptors: *Water supply, *Water reuse, Sewerage, *Waste water treatment, Reservoirs, Runoff, Aeration, Construction.
Identifiers: Moscow, U.S.S.R., Vazuza River.

Extensions and implementations are planned for the water supply and sewer system of Moscow to provide for the increasing population and water resource deficit. A 2% increase of water supply is anticipated for the coming years. The daily water supply is projected at 4.4 million cubic meters in 1975, 5.3 million in 1985, and 7 million by 2000, with 30% assigned for industrial and air conditioning purposes. Industries will be forced to focus on developing water recycling methods. A new water reservoir is under construction on the Vazuaz River and is expected to provide 1.7 million cubic meters of water daily. To prevent contamination of the surface reservoirs within the metropolitan area, the separate canal networks will be converted into a unitary system handling both the sewage and runoff waters; an aeration system with a daily capacity of one million cubic meters will also be provided. (Sandoski-FIRL)
W76-00783

ADVANCES IN WASTEWATER TREATMENT IN MELBOURNE: SOUTH EASTERN SYSTEM,
Caldwell Connell Engineers, Melbourne (Australia).
R. C. Aberley, and A. W. Bird.
Water and Sewage Works, Vol 119, No 11, p 80-89, November, 1972. 2 fig, 2 tab.

Descriptors: *Waste water treatment, *Treatment facilities, Sewers, Sewerage, Population, Interceptor sewers, Outfall sewers, *Australia.
Identifiers: Melbourne(Australia).

The South Eastern Sewerage System for Melbourne, Australia, projected for completion in 1975, will intercept waste water from Melbourne's eastern, northeastern, and southeastern suburbs and convey it to a new treatment plant. The system will cost $180 million and will provide generally for a population in excess of 1.5 million; when fully developed it will provide for about 3.5 million population. The system consists of four major elements: intercepting and trunk sewers, pumping stations, the purification plant, and an effluent outfall sewer. Designs for pre-treatment, primary and secondary treatment, solids treatment and disposal, process control, and auxiliary and power systems and personnel requirements have been developed. (Sandoski-FIRL)
W76-00784

WASTEWATER TREATMENT IN A PRESSURE PIPE,
Irvine Ranch Water District, Calif.
R. Stoyer, and J. Scherfig.
The American City, Vol 87, No 10, p 84, 86, 90, 93, October, 1972. 2 fig, 2 tab, 1 ref.

Descriptors: *Waste water treatment, *Pipelines, Biological treatment, Biochemical oxygen demand, Activated sludge, Water reuse, Aeration.
Identifiers: Pressure pipe treatment, Aerobic sludge.

Waste water treatment within a pressure pipeline shows promise of producing better than 90% BOD removals, with costs at 40% less than a conventional secondary treatment and reclamation system. The pressure pipe treatment (PPT) system provides both transportation and treatment in the pipeline used to deliver the reclaimed water to the point of reuse. Biological treatment occurs in the pipeline by a modification of the conventional activated sludge process. The introduction of air or pure oxygen in the pipeline maintains the necessary dissolved oxygen for the process. Activated sludge, removed at the upstream end of the pipeline, returns to the downstream and via a sewer. The system is composed of influent headworks, primary sludge separation, an aerobic sludge activator, a wet well, an air compressor, a PPT pipeline, a sludge removal process, final processing, and reclaimed water distribution. (Sandoski-FIRL)
W76-00785

TREATED SEWAGE FOR POWER PLANT MAKEUP WATER,
R. Dvorn, and R. Wilcox.
Power Engineering, Vol 76, No 11, p 40-41, November, 1972. 2 fig.

Descriptors: *Waste water treatment, *Treatment facilities, *Sewage treatment, Tertiary treatment, Waste reuse, Cooling towers, Boiler feed water, Activated sludge, Phosphates, Biochemical oxygen demand, Suspended solids, Lime.
Identifiers: Alum.

Effluent from the secondary stage of municipal sewage treatment plant is amenable to tertiary treatment to fit it for use as a power plant make-up water. The majority of make-up water is used for cooling towers and boiler feed. The secondary treatment stage of the sewage plant is activated sludge. Its effluent is pumped to a Gravier clarifier at a rate of 3000 gpm where phosphates, BOD, and suspended solids are reduced to .ow values. The incoming flow passes through a flash mixing section where it is mixed with lime and alum at the rate of 2.0 pounds lime and 0.25 pounds alum per 1000 gallons of water. (Sandoski-FIRL)
W76-00786

CONSTRUCTION AND EQUIPMENT OF SEWAGE PLANTS, NEW TENDENCIES IN THE FIELD OF CONSTRUCTION AND EQUIPEMNT

OF SEWAGE PLANTS (BAU UND AUSRUESTUNG VON ABWASSERANLAGEN),
E. Kuntze.
Technique Mitteilungen, Vol 65, No 9, p 409-412, September, 1972.

Descriptors: *Treatment facilities, *Waste water treatment, *Sewerage, Construction costs, Automation, Control systems, Data processing, Runoff.
Identifiers: West Germany, Pressure drainage, Vaccum drainage.

Until recently, gravity has been used as the only source of energy for collection and transport of sewage waste water in Germany thus offering technical solutions for determining construction principles for city sewer networks and hydraulic capacity limitations. In view of high costs for the construction of sewer systems, methods must be developed for better utilization of present capacity. Electronic network plan computation permits the determination of a sewer system's compound effect as a prerequisite to the use of available capacity by suited regulation systems. In the city of Hamburg, such a control system is being realized. As a first step teleprinting rain gauge and teleprinting depth indicators in the sewer have been installed. The most favorable runoff conditions of the system are computed by electronic data processing. Two new methods have been developed to aid improvement, those being pressure drainage and vaccum drainage. (Sandoski-FIRL)
W76-00787

SCALE-UP AND PROCESS DESIGN TECHNIQUES FOR FIXED FILM BIOLOGICAL REACTIONS,
Quirk, Lawler and Matusky, New York.
T. P. Quirk.
Water Research, Vol 6, No 11, p 1333-1360, November, 1972. 20 fig, 4 tab, 3 ref.

Descriptors: *Model studies, *Waste water treatment, *Biological treatment, Computer programs, Biochemical oxygen demand, Sewage, Effluents.
Identifiers: Bio-oxidation, Biological film.

Theoretical models for bio-oxidation using a sheet flow reactor with a fixed biological film similar to that used in a trickling filter were developed. The models assumed plug flow hydraulics and accept numerous assumptions for BOD removal kinetics including: zero order, first orderk Michaelis-Menton, and retardant mechanisms. Systems models were constructed incorporating hydraulics, kinetics and film geometry and results arranged topograhically into linear expressions which allow graphical determination of the rate constants from plots of experimental data. Application of the theoretical model is verified using operating data from laboratory studies of municipal sewage, kraft mill effluent, sulfite mill effluent, hard-board mill effluent, and yeast fermentation effluents. BOD concentrations examined varied from 200 to 600 mg; 0.1 pH changes from 4.5 to 9.8 were evaluated. Temperature varied from 15 to 30C in a series of controlled experiments. Computer programs were developed to accept performance data and to perform the following functions: rearrange units of expression; compute correlation parameters; tabulate all data, graphically array correlations, and to compute model rate constants. Scale-up calculations and verification of the scale-up technique are presented to allow application of laboratory rate constants to determine the prototype rate constant for a specific film geometry. (Sandoski-FIRL)
W76-00788

AID TO MUNICIPALITIES FOR WATER SUPPLY, POLLUTION ABATEMENT AND SEWER SEPARATIONS.
For primary bibliographic entry see Field 6E.
W76-00789

WASTE DISPOSAL METHOD,
T. A. Nevin, and D. D. Woodbridge.
Canadian Patent 914,810. Applied September 3, 1969. Issued November 14, 1972. Patent Office Record, Vol 100, No 46, p 4774, November 14, 1972.

Descriptors: *Waste water treatment, Effluents, *Water reuse, Water supply, Sewage, Sewage treatment, Slurries, Sludge, *Patents, Waste disposal.
Identifiers: Ammonia removal, Methane removal, Lipid removal.

A patent has been assigned to Energy Systems, Incorporated of Melbourne, Florida for a waste treatment method of sewage and other liquid wastes in which the final effluent is adaptable for immediate reuse in a water supply system. Raw sewage is screened and the grit removed prior to mixing the sewage into a more uniform slurry. The slurry is processed to remove ammonia, methane, and acid insoluble lipids. The defatted, methane free slurry then has the sludge concentrated for further processing, soil enrichment or burning while the effluent is paaed through a series of different processes for removing various harmful or useful materials. This series of processes significantly includes the adapting of chemostats for usage in water treatment. Finally the effluent is prefiltered, passed through a radiation sterilizer, then a polishing filter, for reuse in a water supply system. (Sandoski-FIRL)
W76-00790

ROCHESTER'S STORMWATER DRAINAGE,
Humphreys (Howard) and Sons, London (England).
A. J. Ross-Smith.
Surveyor, Vol 140, No 4201, p 26-29, December 15, 1972. 6 fig.

Descriptors: *Floods, *Sewerage, *Sewers, Runoff, Drainage systems, Separated sewers, Infiltration, Flood control, Surface drainage, Urban runoff, Waste water treatment.
Identifiers: Rochester, England, Medway River.

The established city of Rochester, England is divided by the River Medway into two drainage areas which have been subjected to periodic flooding. In more recently developed areas, drainage is on the separate system yet during storms excess runoff infiltrates the older parts of the city causing flooding in low-lying areas. To alleviate this constant problem, the city council in 1963 financed a report on the city's surface water drainage system including necessary works to prevent flooding. It was recommended that a separate surface water system supplement or replace the existing sewers. As total redevelopment takes place over the years, the existing partially separate system will be replaced by completely separate sanitary and surface water sewers. (Sandoski-FIRL)
W76-00791

OAKLAND MAPS PROGRAM TO COMBAT SEWER INFILTRATION,
California State Dept. of Public Works, Oakland.
J. E. McCarty.
Public Works, Vol 104, No 2, p 82-83, February, 1973. 3 fig.

Descriptors: *Sewers, *Maps, *Maintenance, Cleaning, Equipment, Maintenance costs, Infiltration, *California, Waste water treatment.
Identifiers: *Oakland(Calif), *Sewer surveillance maps.

Development of a sewer surveillance map procedure and a preventive maintenance program based on use of modern sewer cleaning equipment have cut the sewer cleaning call rate from 50 to three calls per week in the northeast sector of Oakland, California. Using city maps for this program, every main is plotted, numbered, and scheduled for cleaning at least once a year. In areas where eucalyptus trees abound, which cause 90 percent of the stoppages, two cleanings per year are scheduled. In addition to mechanical and hydraulic cleaning, the area is chemically treated once a year by a flood and hold method applied one month prior to the scheduled rodding. The control reports coupled with the surveillance maps indicate that maintenance costs average 4.5 cents per foot of sewer. (Sandosli-FIRL)
W76-00792

NOMOGRAMS FOR SEARCH OF SYMBOLS PU AND TU OF STORM OVERFLOW IN A MIXING CONDUIT (NOMOGRAMME ZUR EMITTLUNG VON PU UND TU EINES RECENUEBERLAUFS DES MISCHWASSERKANALS),
H. Sold.
Wasser und Boden, Vol 24, No 9, p 312-315, 1972. 4 fig, 3 ref.

Descriptors: *Sewerage, Combined sewers, *Storm runoff, Water levels.
Identifiers: *Nomograms, West Germany, *Storm overflows.

Nomograms for searching optimum values of the water level, tu, and have weir crest height, pu, for the end of storm overflows in mixed sewer systems have been developed according to the preliminary guidelines of the West Germany Waste Water Association. The nomograms were elaborated for one storm overflow length, seven flow reducer section dimensions, eight reducer section slopes, and one pipe surface roughness. Optimum values of tu and pu, of the load capacity of the reducer section, the reducer diameter, bed slope, and of the storm overflow length are found in the nomogram as a function of the acceptable overload caused by the storm runoff in the outgoing sewer system. (Sandoski-FIRL)
W76-00793

SEWER OVERFLOW - EVALUATION OF MODEL TEST AND USE IN SEWER TECHNIQUE (REGENUEBERLAEUFE - EINE AUSWERTUNG VON MODELLVERSUCHEN MIT ANWENDUNG AUF DIE KANALISATION-STECHNIK),
K-C. Taubmann.
Gas Wasser Abwasser, Vol 52, No 10, p 297-308, 1972. 17 fig, 2 tab, 5 ref.

Descriptors: *Model studies, Sewerage, *Sewers, *Overflow, Weirs, Overfalls, Separated sewers.
Identifiers: *Switzerland, Hydraulic range.

Model tests of different types of sewer overflow to define their hydraulic range of application are discussed. These tests were carried out at the Laboratory of Hydraulic and Earthwork Engineering, Technical University of Zurich. Results for separate sewage systems indicate that the usual weir can only be recommended for the range of small base fall of mixed water inflow. A weir with an overfall and a following throttle section can be used in the transition region between a current and flowing water. For the range of big base fall, a leaping weir is recommended. The leaping weir was tested systematically. Using detailed model tests, the common calculation method can be enlarged and improved, especially for soil opening geometry and separate sewers. (Sandoski-FIRL)
W76-00794

THE OPERATION SYSTEM OF URBAN SEWERAGE TREATMENT (TOSHI GESUISHORIJO NO OPERESHON SHISUTEMU NI TSUITE),
Fuji Electric Co. Ltd., Tokyo (Japan).
Y. Ito.
Kankyo Sozo, (Environmental Creation) Vol 2, No 10, p 45-52, October, 1972. 7 fig.

Descriptors: *Control systems, Operation and maintenance, *Sewage treatment, *Treatment facilities, *Waste water treatment.
Identifiers: *Japan.

The systems operation of an urban sewage treatment plant in Japan involves taking various measurements at each treatment plant and directly sending them to a control room, with data at distant pumps and rivers being sent by telemeters. The control room consists of a monitoring room, a calculator room, and an electric panel console room. The collected data are handled by a computer and the results transmitted directly as control orders to operators, relay panels, sequences for operating pumps, receivers, gates, and valves. Transmitter pumps are operated by telecommunication remote control. Industrial television monitors the conditions of each treatment plant, and the data are recorded generating alarm signals on the operation guide which automatically initiates necessary action. As supplementary apparatus, television and slide displays, an audio stem, typewriters, and trend recorders are used. (Sandoski-FIRL)
W76-00795

ELECTRONIC COMPUTATION OF QUANTITIES AND COSTS FOR SEWERAGE SYSTEMS CONSTRUCTION (MASSENERMITTLUNG UND KOSTENBERECHNUNG IM KANALISATIONSBAU MIT ELEKTRONISCHEN DATENVERARBEITUNGSANLAGEN),
G. Euler, R. Golueke, K. Lerch, and K. J. Ueker.
Wasser und Boden, Vol 24, No 10, p 307-311, 1972. 7 tab.

Descriptors: *Sewerage, *Construction, *Estimated costs, Cost analysis, Construction materials, Automation, Computer programs, Operating costs, Waste water treatment.

A procedure for the electronic computation of quantities and costs for construction of sewerage systems used for cost estimates, dispositions, and the determination of standing values of existing sewerage systems, has been developed. Materials and job costs, type of soil and trench, groundwater level, pipe diameter, bedding conditions, and type of sheet piling are among the input data. Per-meter prices of materials and individual jobs are computed from the output data contained on three data lists and these unit prices are then integrated for a given sewer section. (Sandoski-FIRL)
W76-00796

SEWERAGE DRAINS MADE OF PLASTIC PIPES (KANALISATION MIT KUNSTSTOFFROHREN),.
Wasser, Luft und Betrieb, Vol 16, No 10, p 363-364, 1972.

Descriptors: *Pipelines, Pipes, *Plastic pipes, Construction materials, *Sewers, Waste water treatment.
Identifiers: *Polyvinyl chloride.

Nordrohr type sewer and drain pipes, made of high-density PVC 100 according to DIN 8061 Standards and used in constructing sewer systems, are resistent to most common chemicals; yet pipes with a nominal diameter of 100-200 mm should not be permanently exposed to wastewater with temperature exceeding 60C, and those with a diameter of 250-500 mm to temperatures higher than 40C. Unlike pipes with a diameter of 100-200 mm, those with diameters larger than 250 mm should be laid in a straight line and free of tension. It is possible to combine PVC with pipes made of other materials such as cast iron or stoneware. (Sandoski-FIRL)
W76-00797

MICROWAVE SEWAGE SYSTEM WITH DISTILLATION MEANS,
Koehler-Dayton, Inc., Dayton, Ohio. (Assignee).
A. H. Cornish, R. C. Helke, A. N. LeDonne, and H. Masters.
United States Patent 3,700,565. Applied April 3, 1970. Issued October 24, 1972. Official Gazette of the United States Patent Office, Vol 903, No 4, p 1368, October 24, 1972.

Descriptors: **Sewerage, *Microwaves, Evaporation, *Patents, Sewage treatment, *Waste water treatment.
Identifiers: Vaporization, Sewage receiving tanks, Evaporation tank.

A self-contained sewage system has been patented in which a microwave energy source is provided to vaporize the liquid phase of the sewage so that it may be removed from the system and the interval between servicings of the system lengthened. The sewage is transferred from the sewage receiving tank to an evaporating tank for evaporation and, in certain embodiments used in situations where power is not at a premium, a portion of the liquid vaporized from the sewage may be returned to the system for flushing purposes. (Sandoski-FIRL)
W76-00800

THE TREATMENT OF RAIN WATER. RAIN OVERFLOW, RAIN OVERFLOW BASINS, RAIN PURIFICATION TANKS, RAIN CATCHMENT BASINS (DIE BEHANDLUNG DE REGENWASSERS),
K. Krauth.
Technische Mitteilungen, Vol 65, No 9, p 445-540, September, 1972. 10 fig, 19 ref.

Descriptors: *Rainfall-runoff relationships, *Sewerage, Overflow, Sewers, Overland flow, Flow duration, Design, Combined sewers, Separated sewers, Treatment facilities, *Waste water treatment.
Identifiers: Germany.

General characteristics of rainfall runoff and design criteria of rain overflows, rain overflow basins, purification tanks, and rain catchment basins are described. The maximum contaminant concentration of effluents from a combined sewer system is reached when rinsiag of the sewer at a flow rate of 0.5-0.6 m/sec commences. Runoff carries 67% of the BOD5-load and 83% of the unsolved matter during the first half of the rainfall duration. Separate sewer systems carry smaller contaminant loads during rainfall, except for the initial period of runoff. Formulae for the calculation of the sewage runoff with and without rainfall, and for the critical runoff for combined sewer systems are mentioned with regard to criteria for design purposes. Design criteria of various overflows for critical combined water runoff include the following: (1) an overflow canal with one- or two-sided weirs (flow cross-section height of 20 cm) that leads into a 3- to 5-cm deeper sewer channel; (2) an overflow channel having a spring opening in the bottom (Approximately 50 cm in length to prevent clogging) through which the excess runoff passes; (3) an overflow channel with horizontal separating plates used for large-capacity sewer systems; and (4) a controlled overflow channel in which a flow height measuring instrument and an electric valve regulate the inflow to the purification plant and stabilize the maximum load of the facility. (Sandoski-FIRL)
W76-00801

NON-LINEAR HYDROLOGICAL MODELS FOR CITY WATER DRAINAGE (NIGHT-LINEARE HYDROLOGISCHE MODELLE IN DER STADTENWAESSERUNG),
For primary bibliographic entry see Field 4A.
W76-00802

THE TOTAL RUNOFF COEFFICIENT IN MIXED SEWER SYSTEMS (DER GESAMTABFLUSSBEIWERT IN MISCHKANALISATIONEN),
For primary bibliographic entry see Field 4A.
W76-00803

SPECIAL TIME SCHEDULE FOR THE CITY AND COUNTY OF SAN FRANCISCO RELATIVE TO REGULATION OF DISCHARGES FROM COMBINED SEWERS,
California Regional Water Quality Control Board, Oakland. San Francisco Bay Region.
For primary bibliographic entry see Field 6E.
W76-00806

ELECTROLYTIC WATER TESTER-FOR DETERMINATION OF OXYDANT OR REDUCING AGENT CONTENT.
Belgian Patent 800,283. Issued November 20, 1973. Derwent Belgian Patents, January 31, 1974.

Descriptors: Equipment, *Patents, *Instrumentation, Treatment methods, *Water treatment, *Waste water treatment, Control systems, Electrolysis.
Identifiers: *Electrolytic water tester.

An electrolytic water tester for the determination of oxydant or reducing agent content is described. It consists of an outer shell with an insulating plug at one end to support a reference. An indicating electrode is at the other end and has the connecting leads from those electrodes passing out of it. The electrode probe is placed within a flow of the water to be analyzed at the axis of flow. The indicator electrode is of precious metal (platinum or gold) and the reference electrode a metal wire (silver or copper); the two electrodes are concentric and have a longer life than probes using calomel as electrode material. The tester is especially used for control information and signals to determine or regulate rate of addition of neutralizing agent in water treatment plants. (Merritt-FIRL)
W76-00841

ACTIVATED SLUDGE SEWAGE TREATER.
German Patent 2,043,148. Issued November 22, 1973. German Patents Abstracts, Vol U, No 48, p 2, January, 1974.

Descriptors: *Patents, Treatment methods, Sewage, *Sewage treatment, *Activated sludge, Aeration, Equipment, Hydraulic equipment, *Waste water treatment.

An activated sludge sewage treater is described which has at least one baffle extending transversely of the longitudinal flow in the annular closed aeration tank. The baffle top edge is below the water level, and the baffle is inclined downward toward the flow to deflect part of it. Preferably the tank has two straight sections joined by curved ones. The aerator is in a curved section at the end of the partition separating the straight sections. The baffle is at the beginning of the straight section downstream of the aerator. (Merritt-FIRL)
W76-00842

METHOD OF FILTRATION.
Australian Patent 441,682. Issued November 8, 1973. The Australian Official Journal of Patents, Trade Marks and Designs, Vol 43, No 42, p 4491, November 8, 1973.

Descriptors: *Patents, *Treatment methods, *Filtration, *Water treatment, Municipal water, *Waste water treatment, Hydraulic equipment.

An improved hyperfiltration process is described for purifying water by removing solute impurities from an aqueous solution. An inert non-solute rejecting filter aid material is deposited to a bed depth of from 0.1 to 100 microns on a porous substrate which contains pores large enough to allow water to pass through. The material has a particle size in the range of 0.01 to 100 microns. The solution is passed over the surface of the bed in cross flow to form a solute- rejecting membrane of the

material on the bed. A sufficient velocity and pressure drop is maintained across the bed to force the solution through and to allow the filtered material to collect. (Merritt-FIRL)
W76-00843

METHOD AND APPARATUS FOR CONVEYING SEWAGE,
B. C. Burns, and H. C. Albertsen.
Canadian Patent 940,011. Issued January 15, 1974. Patents/Brevets, Vol 102, No 3, p 191, January 15, 1974.

Descriptors: *Patent, Treatment methods, Conduits, *Sewers, Engineering structures, *Pressure conduits, Hydraulic conduits, *Sewage disposal, *Waste disposal, Waste water treatment.

A method and apparatus for conveying sewage from sewage sources such as residences to a remote location are described. The sewage is initially conveyed by gravity flow from the source into a collecting tank and by vacuum-induced plug flow to a vacuum receiver tank at the remote location. The sewage may be discharged from the remote location, preferably under positive pressure, into another line such as a vacuum line for further vacuum-induced plug flow or a gravity flow conduit. The final location to which the sewage is conveyed may be the sewage treatment facility. Substances for treating the sewage may be advantageously introduced into the system and mixed with the sewage during conveyance. Self-scouring tanks, rotation-imparting plug reformers, and several alternative ways of introducing controlled amounts of air at or above atmospheric pressure into the vacuum portion of the system are provided. (Merritt-FIRL)
W76-00844

SURFACE SCUM EXTRACTOR-FOR RECTANGULAR FLOTATION TANK IN SEWAGE WORKS.
Belgian Patent 801,156. Issued October 15, 1973. Derwent Belgian Patents Reports, January 31, 1974.

Descriptors: *Sewage treatment, *Flotation, Treatment methods, *Patents, *Scum, Equipment, *Waste water treatment, Water treatment, Hydraulic equipment, Separation techniques.
Identifiers: *Tanks.

A surface scum extractor for a rectangular flotation tank in sewage works is described. A bridge structure running on parallel rails along the sides of the tank carries a rotating drum in the form of two end checks between which are a number of horizontal dredger bucket cross-section scraper blades. These move in the opposite direction to that of the bridge as it traverses the length of the tank, and discharge by gravity into a coaxial worm and trough extractor, or conveyor belt or sloping gutter. At the rear of the bridge is a hinged pusher plate which forces the floating matter forwards on to the blades as the bridge moves forwards. By placing a similar pusher on the front of the bridge and operating them differentially, along with the use of double profile bucket blades, the system may be made bidirectional. (Merritt-FIRL)
W76-00845

METHOD AND APPARATUS FOR INCINERATING POLLUTED LIQUIDS AND MUD,
For primary bibliographic entry see Field 5E.
W76-00846

PIPELINE PIG OR SWIPE,
For primary bibliographic entry see Field 8G.
W76-00848

EFFLUENT WATER TREATMENT,
A. Heidrich.
French Patent 2184-917. Issued February 1, 1974. French Patents Abstracts, Vol. 5, No. 11, February, 1974.

Descriptors: *Patents, *Effluents, Salts, Water quality, *Waste water treatment, *Sludge treatment.
Identifiers: Chlorisocyanuric acid, Na aluminate, NaOH, Na tripolyphosphate, Oil emulsions, Humic acid colloids, Chemical processes.

Effluent water is treated with an agent consisting of (a) chlorisocyanuric acid or salts of this, (b) Na aluminate, (c) NaOH (d) Na tripolyphosphate or Na hexametaphosphate and Mg sulphate or Mg chloride or Mg oxide. The agents, when added to contaminated water containing fats, or oil emulsions, of humic acid colloids, give excellent proportion of the impurities and purification of the water. The process is especially effective with oil emulsions if the treated water is also subjected to an electric field between two electrodes to give a rapid proportion of the oil as a sludge. (Prague-FIRL)
W76-00849

ACTIVATED SLUDGE PURIFICATION STATION FOR WASTE WATER AND SEWAGE TREATMENT,
French Patent 2187-705. Issued February 22, 1974. French Patents Abstracts, Vol. 5, No. 11, p 6, February, 1974.

Descriptors: *Patents, *Activated sludge, *Waste water treatment, *Sewage treatment, Stations, Water purification, Injection, Equipment, Tanks.

The station consists of a tank in the form of a body or revolution, with a horizontal axis and is divided internally by partitions which form the boundaries of a primary settlement chamber. The partitions also form, with the end walls, two volumes, one of which acts as a secondary settlement chamber. An injection chimney for the activated sludge has its lower, bell-mouthed end provided with an air nozzle to keep the liquid rising in the chimney. The upper part of the secondary settlement chamber includes an undisturbed filtration area, with an outlet for the purified water. The incoming sewage is seeded immediately in the injection chimney and is mixed with the stream of activated sludge; any abnormal flows can be dealt with satisfactorily. (Prague-FIRL)
W76-00851

WASTE WATER TREATMENT CHEMICAL REACTOR,
French Patent 2187-398. Issued February 22, 1974. French Patent Abstracts, Vol. 5, No. 11, p 5, February, 1974.

Descriptors: *Patents, *Waste water treatment, Chemical reactions, Pressure, Power, Lime, Equipment, Hydrogen ion concentration, Hydrogen sulfide.
Identifiers: *Chemical reactors.

The reactor, separated by a perforated partition from an overhead 'plug flow' reaction chamber, has a bottom inlet below a convergent/divergent blending nozzle. The throat is fed a reagent, such as a coagulant or a flocculant. The reactor has a low pressure drop (.2-.5 bar), low power requirement, reduced dead space, and is not subject to by-passing reaction. It may be controlled in response to sensors (pH detectors) in upper and lower chambers. The reactor is especially useful for treatment of waste water, such as with lime or H_2SO_4 to control pH. (Prague-FIRL)
W76-00852

CONTINUOUS SEEDING AND ACTIVATING DEVICE,
French Patent 2190-742. Issued March 8, 1974. French Patents Abstracts, Vol. 5, No. 13, p 6, March, 1974.

Descriptors: *Patents, *Septic tanks, Activation, Effluents, Equipment, *Waste water treatment.
Identifiers: Culture media, Activating devices, Biological purification.

A seeding and activating device for septic tanks consists of a cylindrical recipient with a movable, inclined cover with holes acting as a strainer. The device is placed below the pipe which feeds the effluents into the tank; it is fixed to this pipe or to the wall of the tank and dips into the liquid layer. The recipient is fitted with an overflow pipe. The culture medium in the device can be fed with fresh organisms and natural nutritive substances which are added as required. At the same time a certain amount of mixing and agitation is effected in the culture medium itself. (Prague-FIRL)
W76-00853

FLOATING MIXER FOR WASTE WATER TREATMENT TANK,
French Patent 2187-399. Issued February 22, 1974. French Patent Abstracts, Vol. 5, No. 11, p 5, February, 1974.

Descriptors: *Patents, *Waste water treatment, *Liquids, Mixing, Tanks, Equipment, Tubes.
Identifiers: Floating mixer, *Mixers.

A float filled with foamed polyurethane, carries an electric motor, and is tethered by cables on the surface of a tank for waste water treatment. The motor drives a helical impeller, shrouded by vertical cylindro-conic tube; flow may be upward or downward. It is deflected radially by a baffle, formed by the bottom of the float, or by a cone in line with bottom of shroud. The motor is protected from liquid by an intercepting plate at bottom of float through which the shaft passes; leakage between shaft and interceptor is returned to the tank by horizontal radial channels through a float. The liquid level maintained above interceptors prevents air entrainment and consequent cavitation at the impeller when flow is downwards. The mixer automatically adjusts to level of the tank liquid and is easily relocated or removed from cleaning. (Prague-FIRL)
W76-00854

SEWAGE DISPOSAL,
E. J. McCrink.
French Patent 2190-738. Issued March 8, 1974. French Patents Abstracts Vol. 5, No. 13, p 6, March, 1974.

Descriptors: *Patents, *Sewage disposal, *Solid wastes, *Liquid wastes, Distillation, Sewage, *Waste disposal, Tanks, Waste water treatment, *Sewage treatment.
Identifiers: Settling tanks.

Liquid and solid waste materials of sewage are allowed to separate in a settling tank. The solids are removed and are heated in a non-oxidizing atmosphere to the point of destructive distillation. The gaseous products are treated by passing them through a flame curtain to remove any noxious odors. The final product is a finely powdered ash which may be removed and easily disposed. (Prague-FIRL)
W76-00855

ANAEROBIC EFFLUENT TREATMENT,
B. V. Stamicarbon.
Belgian Patent 803-949. Issued February 25, 1974. Derwent Belgian Patents Reports, Vol. 5, No. 11, p 1, April 18, 1974.

Descriptors: *Patents, *Sludge, Tanks, Flow, Microbiology, Effluent treatment, Anaerobic conditions, Water purification, *Denitrification, Sludge disposal, Waste treatment.
Identifiers: *Microbiological purification, Anaerobic purification.

Anaerobic microbiological purification of effluent is supplied tangentially to a rotationally symmetrical purification tank containing a microbiological sludge, by introducing the effluent below the surface of the water through greater or greater than 1 device. The outermost of these lies at a distance from the edge of the tank corresponding to 0.5-1.0 times the height of the water, at a velocity such that the tangential flow velocity at any point in the tank is 0.5-2 m/sec and more especially 0.2-1 m/sec. The water containing the micro-biological sludge is discharged after residence in the tank through an opening in or near the center of the tank. (Prague-FIRL)
W76-00856

METHOD AND APPARATUS FOR TREATING SEWAGE,
H. Brociner.
Canadian Patent 944,089. Issued March 19, 1974. Patents/Brevets, Vol. 102, No. 12, p 1057, March, 1974.

Descriptors: *Patents, *Solids, *Sewage, *Sewage treatment, Streams, Effluents, Equipment, Canada, Flow, Liquids, Weirs, Solid wastes, Separation techniques, Waste water treatment.
Identifiers: Effluent sewage, Heavy solids.

Elimination of heavy solids, such as grit, from sewage streams prior to introduction into treatment tanks is necessary as such solids interfere with normal operations. Substantially all of the heavy solids are removed by a process and apparatus where raw sewage is introduced into a tank with the bottom sloping downwardly from the far side to a trough adjacent a first sidewall, with even distribution along the first sidewall. A predetermined small range of liquid level variation is maintained by flowing effluent sewage over a weir extending above the full length of the top of the sidewall opposite the first sidewall. Air is introduced with even distribution through and along the first sidewall to induce circulatory flow of liquid and light-weight solids upwardly and then in the direction of the opposite sidewall. This turns the circulatory flow direction downwardly toward the tank floor by a baffle spaced from the opposite sidewall and positioned transferse to the direction of liquid flow through the tank, to effect separation of light-weight solids and flowing the sewage suspension under the baffle and upwardly for removal by flow over the weir. (Prague-FIRL)
W76-00857

SEWAGE PURIFIER WITH DROP BODY AND SUMP TROUGH FOR ACTIVATED SLUDGE.
German Patent 2028047. Issued March 21, 1974. German Patents Abstracts, Vol 5 No 7, p 2, March, 1974.

Descriptors: *Patents, *Sewage, *Water purification, *Activated sludge, Sumps, *Sewage treatment, *Waste water treatment.
Identifiers: *Sewage purification, Central mixing zone, Settling zone, Sump trough, Drop body.

A central mixing zone is bounded by walls reaching on all sides above the liquid surface in the trough. It extends out from into the trough, from the settling zone between these walls and the inner side of the trough's bounding wall. The raw sewage inlet ducts, the drop body drain, and the branch duct for the returned settled sludge and liquid open into the mixing zone. The settling zone is divided into separate zones to interrupt the horizontal movement of liquid. (Prague-FIRL)
W76-00858

BIOLOGICAL PURIFICATION OF SEWAGE,
French Patent 2190-739. Issued March 8, 1974. French Patents Abstracts, Vol 5, No 13, p 6, March, 1974.

Descriptors: *Patents, *Sewage, Biological treatment, Reservoirs, Sewage water, Anaerobic conditions, Nitrates, Clarification, *Sewage treatment, Waste water treatment.
Identifiers: *Biological purification, Feed reservoirs, Aerobic treatment.

Purification is carried out using three reservoirs of which greater or equal to 2 serve as feed reservoirs for the sewage water, and one as a clarification reservoir. The sewage water in the first feed reservoir is circulated aerobically for part of the time and anaerobically for the rest of the time. It is then discharged to the clarifying reservoir through the third reservoir where it has aerobic treatment. The feed reservoir may be connected to the clarifying reservoir directly during its aerobic period, and to the third reservoir during its anaerobic period. The functions of the two feed reservoirs are changed over periodically. Precipitation takes place in the presence of inorganic compounds, in particular of nitrates, which may be produced. (Prague-FIRL)
W76-00859

BIOLOGICAL SEWAGE TREATMENT PLANT WITH CENTRIFUGAL AERATOR AT WATER SURFACE,
German Patnet 1759861. Issued March 21, 1974. German Patents Abstracts, Vol 5, No 7, p 1, March, 1974.

Descriptors: *Sewage treatment, *Patents, *Biological treatment, *Treatment plants, Channels, Tanks, *Waste water treatment, Oxidation.
Identifiers: Oxidation tank, Biological sewage treatment plant, Sewage flow, Aerators.

A partition between two straight troughts forming the oxidation tank reaches solely up to the aerator/circulator, which rotates about a vertical axis at one of the curved sections connecting the troughs. The partition is curved near the aerator twoard the channel side in which the sewage flows down toward the aerator. (Prague-FIRL)
W76-00860

NERC 74, ANNUAL REPORT.
National Environmental Research Center, Cincinnati, Ohio.
For primary bibliographic entry see Field 5G.
W76-00879

ASSESSING A MARSH ENVIRONMENT FOR WASTEWATER RENOVATION,
Agricultural Research Center, Fort Lauderdale, Fla.
K. K. Steward, and W. H. Ornes.
Journal Water Pollution Control Federation, Vol. 47, No. 7, p 1880-1891, July 1975. 7 fig, 6 tab, 28 ref.

Descriptors: *Reclaimed water, *Water reuse, *Marshes, *Florida, Marsh plants, Soils, Nutrients, Waste water(Pollution), Plant physiology, Nutrient requirements, Physiological ecology, Plant growth, Nitrogen, Phosphorus, Potassium.
Identifiers: *Everglades National Park.

Experiments were conducted in situ on isolated plots in a marsh to assess the capability of the system for renovating wastewater. Artificial enrichment of sawgrass did not produce increased growth even though nutrients were assimilated. Thus, growth was not nutrient limited. Weekly applications of 2.2 kg/ha of phosphorus increased tissue levels fivefold after 22 wk. However, this increase represented only 12% of the amount applied. The marsh system seems to have a limited capacity for assimilating nutrients. This capacity was stressed after 3 wk and overloaded by 8 wk at a continuous rate of enrichment. Because of this capacity for nutrient absorption, it was unlikely that sawgrass plants could be used to renovate wastewater efficiently with high nutrient concentrations. (Sims-ISWS)
W76-00892

MONITORING ON-FARM WASTE MANAGEMENT SYSTEMS.
Iowa State Univ., Iowa City. Agricultural Extension Station.
S. W. Melvin, D. H. Vanderholm, and J. C. Lorimor.
Presented at 1973 Winter Meeting, American Society of Agricultural Engineers, Chicago, Illinois, December 11-14, 1973, Paper No. 73-5542, 9 p.

Descriptors: *Monitoring, *Farm wastes, *Management, Hogs, Cattle, Feed lots, Runoff, Odor, Costs, Livestock, Corn Belt, Iowa.
Identifiers: Beef.

Research and demonstration sites were established to study waste management alternatives applicable in the Corn Belt. These sites were all commercial livestock operations including a wide variety of beef and swine handling systems. Among the data collected were runoff quality and quantity, waste characteristics, climatic data, cost data, and operating characteristics and problems. Results of the study showed that regular cleaning and maintenance of a low stocking rate in open feedlots results in pollutional strength of retained feedlot runoff of nearly 1/10 the pollutional strength of lots seldom cleaned, heavily stocked, and heavily packed with manure. Most debris basins or settling channels required a stabilized bottom of concrete or gravel to allow proper cleanout and maintenance. These sites have proved to be valuable resources in the animal waste management educational program carried on by Iowa State University extension staff. (Cameron-East Central)
W76-00914

HYDRAULIC HANDLING OF POULTRY MANURE INTEGRATED INTO AN ALGAL RECOVERY SYSTEM.
California Univ., Berkeley.
G. C. Golueke, and W. J. Oswald.
In: Proceedings of the 1969 National Poultry Litter and Waste Management Seminar, Salisbury, Maryland, September 29-30, 1969, p. 57-78. 6 fig, 14 ref.

Descriptors: *Poultry, *Farm wastes, *Hydraulics, *Waste treatment, *Algae, Recycling, Settling tanks, Digestion tank, Feeds, Effluent, Aerobic conditions, Anaerobic conditions, Centrifugation.
Identifiers: *Manure, *Algae pond, Loading rates.

Because of increasing pollution regulations and urbanization of rural areas, the problems of disposal of animal wastes are becoming more complex. Disposal by land spreading has in the past been the major means of disposal, but in many areas this method is no longer feasible. New and economically feasible methods of disposal are being developed and adopted. One such method is photosynthetic reclamation, with the incorporation of a manure hydraulic flushing and transport system. At the University of California's Sanitary Engineering Research Laboratory a three-year project is being conducted. Its objectives are to reduce the nuisance qualities of wastes and in the process, researchers are trying to recover algae which would be fed back to the animals. The project also involves the laboratory studies and design and construction of an algae growth pond. Plans for the future call for experiments in which the anaerobic phase will be by-passed. Also the algae which is harvested as a product of the wastes will be fed to ruminants to determine its nutrient potential. (Russell-East Central)
W76-00915

SOCIAL, LEGAL, AND ECONOMIC CONSIDERATIONS OF ANIMAL PRODUCTION IN URBANIZED AREAS,
A. Aust.

In: Second National Symposium on Poultry Industry Waste Management, University of Nebraska, Lincoln, May 19-20, 1964, p. 225-240.

Descriptors: *Poultry, *Management, *Legal aspects, *Social aspects, *Economics, *Urbanization, Water pollution sources.

Within the last forty years, our country has undergone extensive urbanization. The poultry farmer or industrialist must face the ever growing urbanization of our society to effectively function in the world of today and tomorrow. There are three social developments which have been accentuated by urbanization that restricts the location of animal processing plants. These are: (1) the growth of large concentrations of people crowded together; (2) the tremendous technological advances of our society; and (3) the growing affluence, education, and cultural sophistication of our society. Because of these social changes many legal developments have taken place in the past few years. New legal restrictions or controls on the animal industry usually fall into four main categories: (1) planning controls; (2) public health controls; (3) public safety codes; and (4) aesthetic controls. Closely related to social and legal developments are the economic considerations affecting the locating of new processing plants and the operation of existing plants. There are three courses of action open to the poultry industrialist in terms of economics. These are: (1) the laissez-faire or do-nothing approach; (2) the self-sufficient approach; and (3) the good citizen approach. The good citizen approach is economically the best approach to the poultry man. (Russell-East Central)
W76-00916

HEALTH ASPECTS OF POULTRY WASTE DISPOSAL,
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
For primary bibliographic entry see Field 5E.
W76-00917

LAGOONS--SINK OR SWIM,
Brender's Leghorns, Ferndale, N.Y.
M. Brender.
In: Second National Symposium on Poultry Industry Waste Management, University of Nebraska, Lincoln, May 19-20, 1964, p. 183-192.

Descriptors: *Lagoons, *Farm wastes, *Poultry, *Waste storage, *Waste treatment, Odor.

'Indoor' and 'outdoor' 'lagooning' are two methods often employed by poultry farmers for waste storage and treatment. With either type, the poultryman fights an odor problem. To prevent odor and to beneficially handle manure, the poultry man should catch manure in waterproof tanks; keep it covered with water at all times; move it out before it settles down; either haul it and spread it on crops or stabilize it in an outdoor lagoon; and move wastes by gravity. The author predicts that present and future research will solve many of the current lagoon odor, decomposition, and pollution problems. (Russell-East Central)
W76-00918

SYSTEMS AND SITUATIONS FOR HANDLING POULTRY WASTES,
Cornell Univ., Ithaca, N.Y. Dept. of Poultry and Science.
C. E. Ostrander.
Presented at the Southeastern Poultry and Egg Association 1971 Poultry Health Seminar, Oct. 18-19, 1971, 7 p.

Descriptors: *Poultry, *Farm wastes, *Waste storage, *Waste treatment, *Waste disposal, *Recycling, Oxidation lagoons, Lagoons, Dehydration, Hydraulic equipment, Fertilizers.
Identifiers: *Waste management, *Land spreading, Refeeding.

Some poultrymen have deep pits to hold the waste until it can be spread on land. These pits must be kept reasonably dry and must be cleaned at least once a year. Another system is the hydraulic system in which the droppings are pushed out by water pressure into a storage facility. Waste then must be placed in an aerobic lagoon to prevent odors. Some men use oxidation ditches. Some attempt storage for long periods of time. As a general rule, waste must eventually be spread on land. Recently, dehydration and recycling as feed has gained attention. Price has been the discouraging factor in dehydration, and only about 10% of the waste can be recycled as feed, leaving the rest to be disposed of by some other method. (Russell-East Central)
W76-00920

STATE OF WISCONSIN V. MICHELS PIPELINE CONSTRUCTION, INC. (ACTION FOR AN ORDER TO CONSTRUCT SEWER SO AS NOT TO CREATE A NUISANCE TO NEIGHBORING LANDOWNERS).
217 N.W.2d 339 (Wis 1974).

Descriptors: *Groundwater availability, *Sewage disposal, *Wisconsin, *Sewage, Judicial decisions, Wastes, Sanitary engineering, Water quality control, Waste disposal, Groundwater resources, Ground water, Water supply, Water table, Subsurface waters, Water pollution.
Identifiers: *Public use, *Nuisance(Water law).

An action was brought seeking an order directing the defendents to conduct construction of a sewer so as not to create a public nuisance. The plaintiff alleged that the defenants undertook construction of the sewer with knowledge that dewatering of the soil would lower the groundwater table from which area residents drew water. The court held that a possessor of land who withdraws groundwater from the land and uses it for a beneficial purpose is not subject to liability for interference with the use of water by another, unless the withdrawal causes unreasonable harm through lowering the watertable. (Proctor-Florida)
W76-00952

CITY OF WAUKENGAN V. POLLUTION CONTROL BOARD (APPEAL FROM PROCEEDING ASSESSING FINES AGAINST CITIES AND CORPORATION).
For primary bibliographic entry see Field 5B.
W76-00954

DISAPPROVAL OF THE DEFERRAL OF WATER POLLUTION CONSTRUCTION GRANT FUNDS.
For primary bibliographic entry see Field 6C.
W76-00986

SOUTHWESTERN STOCKHOLM REGIONAL TREATMENT SYSTEM,
Southwestern Stockholm Regional Water and Sewerage Works, Inc. (Sweden).
A. Cronstrom.
J Water Pollut Control Fed, Vol 45, No 8, p 1783-1788, 1973, Illus.

Descriptors: *Waste water treatment, Sweden.
Identifiers: Lake Malareu(Sweden), Himmerfjarden Bay(Sweden).

In 1963, the Court of Water Law passed a ruling that established guidelines for sewerage planning in the greater Stockholm area of Sweden. The ruling required that all wastewater treatment shall maintain a biochemical O2 demand removal of 95% during normal operating periods; existing combined sewers shall be reconstructed as separate systems; Lake Malaren, the freshwater source for the area, shall ultimately be relieved of all sewerage outlets; and the discharge of nutrients shall be limited by providing the best technique of treatment. To meet the demands of the ruling, an interregional system was proposed. All wastewater will be collected in a central system and treated at an activated sludge plant before discharge to Himmerfjarden Bay on the Baltic Sea.--Copyright 1974, Biological Abstracts, Inc.
W76-00996

5E. Ultimate Disposal Of Wastes

ENVIRONMENTAL SURVEY OF TWO INTERIM DUMPSITES-MIDDLE ATLANTIC BIGHT. SUPPLEMENTAL REPORT.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-239 257, $5.25 in paper copy, $2.25 in microfiche. Environmental Protection Agency, Report EPA 903/9-74-010B, October, 1974. 105 p, 30 fig, 6 tab, 28 ref. D. H. Lear, editor.

Descriptors: *Water pollution effects, *Waste disposal, *Oceans, Environmental effects, Surveys, Benthic fauna, Iron, Heavy metals, Cadmium, Mollusks, Zooplankton, Ultimate disposal, Atlantic Ocean.
Identifiers: *Ocean dumping, Vanadium, Atlantic Bight.

Supplemental data from an environmental survey of two interim dumpsites in the Mid-Atlantic Bight are reported. Dissolved and particulate organic carbon accumulations were not found in the water column studied. Dissolved and particulate organic carbon accumulations are probably dependent on time of latest release and are also a cumulative function of time. No patterns of distribution in the water column were observed for particulate and dissolved iron, in spite of the weak themocline. Statistical treatment of the data shows that metals disposed of in the oceans accumulate in the tissue of benthic organisms in quantities roughly proportional to the amounts dumped, that certain metals, such as vanadium and cadmium, are dumped in such quantities in one of the two studies such that they may be used as tracers for that dumpsite, and that the effects of these dumped materials are spread over a large undetermined area. Zooplankton populations at the sample locations showed no effects of stress. (Orr-FIRL)
W76-00511

IDENTIFICATION OF OBJECTIONABLE ENVIRONMENTAL CONDITIONS AND ISSUES ASSOCIATED WITH CONFINED DISPOSAL AREAS,
Little (Arthur D.), Inc., Cambridge, Mass.
For primary bibliographic entry see Field 5B.
W76-00516

GROUND WATER POLLUTION FROM SUBSURFACE EXCAVATIONS: PART V, OTHER TYPES OF WELLS.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5B.
W76-00525

GROUND WATER POLLUTION FROM SUBSURFACE EXCAVATIONS. PART IX, LANDFILLS.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5B.
W76-00526

FATE OF TRACE METALS IN LOS ANGELES COUNTY WASTEWATER DISCHARGE,
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering; and Massachusets Inst. of Tech., Cambridge. Ralph M. Parsons Lab. for Water Resources and Hydrodynamics.
For primary bibliographic entry see Field 5B.
W76-00545

INCENERATOR FOR RAW SEWAGE,
Morse Boulger, Inc., Flushing, N.Y. (Assignee).
C. M. Mainka, and G. A. Nash.
United States Patent 3,896,745. Issued July 29, 1975. Official Gazette of the United States Patent Office, Vol 936, No 5, p 1647, July, 1975. 1 fig.

Descriptors: *Patents, *Sewage disposal, *Incineration, Waste disposal, *Waste treatment.
Identifiers: *Incinerators.

A patent was granted for an incinerator for the thermal disposal of raw sewage. The housing consists of: a primary combustion chamber, a secondary combustion chamber, and a mixing chamber connecting the primary and secondary combustion chambers. A burner is mounted on the housing, and includes means for injecting a flame through the primary combustion chamber, toward the mixing chamber. There the flame functions to ignite waste material, producing combustion gases. Any liquid constituents of the waste material are vaporized, and an induced draft is produced in the primary combustion chamber. This causes the flow of combustion gases and vapor toward and through the mixing chamber, into the secondary combustion chamber. There the mixture is ignited for secondary combustion. A flue mounted on the housing conducts residual combustion gases from the secondary combustion chamber into the ambient atmosphere. (Kramer-FIRL)
W76-00580

COUNTER-FLOW SLUDGE BURNER,
J. E. Hanway, Jr.
Canadian Patent 973,018. Issued August 19, 1975. Patent Office Record, Vol 103, No 33, p 26, August 19, 1975.

Descriptors: *Sludge treatment, *Sludge disposal, *Incineration, *Combustion, *Patents, Equipment, Ultimate disposal, Oil, Pumping, Temperature, Waste treatment.

An incineration method for sewage sludge has been patented. The dewatered sludge is dispersed downwardly in an upwardly flowing atmosphere within a firebox where the temperature is maintained high enough to dry and burn the sludge while it is falling. The ash and other products of combustion move upwardly to a gas scrubber and ash separator; relatively clean gas is discharged to the atmosphere. The firebox is preheated by a burner at the bottom of the box. Further burning of fuel at this burner or addition to the sludge feed is performed as required to maintain the necessary temperature. Addition of fuel oil to the sludge before pumping the sludge facilitates pumping, and achieves mixing. Supplementary air is fed in somewhat tangentially at the bottom to impart rotation to the gases within the firebox. (Orr-FIRL)
W76-00590

SEPTIC TANKS,
Carlson (Andrew) and Sons, Inc. Kings Park, N. Y. (Assignee).
A. L. Carlson, and J. R. Pinezich.
United States Patent 3,898,162. Issued August 5, 1975. Official Gazette of the United States Patent Office, Vol 937, No 1, p 202-203, August, 1975. 1 fig.

Descriptors: *Patents, *Sewage disposal, *Waste disposal, *Septic tanks, Equipment.

A patent has been issued for a method of sewage disposal. The system consists of a leaching pool having a wall with effluent slots and a frusto-conical dome atop the wall which forms the top and sides of a concave-convex bowl-shaped septic tank. This tank is located below the level of the top of the leaching pool wall and has a peripheral flange held by the leaching pool wall top and the dome. The flange supports the septic tank in the upper part of the pool, and the septic tank extends only part of the way down into the leaching pool and is provided with an inspection opening in its bottom. The inspection opening is held closed and sealed by the weight of sewage in the tank. Included in the systems are a baffled inlet in one side of the dome and a tubular outlet partly within the dome and partly within the septic tank for the discharge of treated sewage into an outlet pool between the tank and the pool wall. (Kramer-FIRL)
W76-00598

GROUND-WATER QUALITY BENEATH SOLID-WASTE DISPOSAL SITES AT ANCHORAGE, ALASKA,
Geological Survey, Anchorage, Alaska.
For primary bibliographic entry see Field 5B.
W76-00656

EVALUATION OF HEALTH HAZARDS ASSOCIATED WITH SOLID WASTE/SEWAGE SLUDGE MIXTURES,
East Tennessee State Univ. Johnson City, Tenn. Dept. of Health Sciences.
W. L. Gaby.
For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402. Environmental Protection Agency, Report EPA-670/2-75-023, April 1975. 47 p, 15 fig, 7 tab, 26 ref. 1DB064;ROAP 24ALU;Task 03. 68-03-0128.

Descriptors: Solid wastes, *Bacteria, Bioindicator, *Parasites, *Public health, *Sewage sludge, Recycling, Sludge, *Pathogenic bacteria.
Identifiers: Pathogens, *Composting, *Windrow composting process.

The health hazards associated with municipal solid waste/sewage sludge composting by the windrow composting process are described. The occurrence and survival of pathogens, parasites, and indicator bacteria at various stages during the composting process are described. The study shows that windrow temperatures of 120F to 167F (49C-74C) maintained for at least 7 days destroy pathogens and human parasites. Dog parasitic ova, however, remain intact 35 days after exposure. Considerable variation in the temperature is found at the top and bottom 2 inches of the windrow indicating that proper turning of the compost is essential to ensure destruction of pathogens and parasites. It is concluded that a properly composted solid waste or solid waste/sewage sludge mixtures is microbiologically acceptable as a soil conditioner for gardens, farms, and lawns, or for filling areas of erosion without creating health hazards. (EPA)
W76-00681

DISPOSAL AND UTILIZATION OF WASTE KILN DUST FROM CEMENT INDUSTRY,
Southern Reserach Inst., Birmingham, Ala.
For primary bibliographic entry see Field 5D.
W76-00686

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES, VOLUME I-SUMMARY,
Dayton Univ. Ohio Research Inst.
N. L. Hecht, and D. S. Duvall.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-033a, May 1975. 33 p, 1 tab. 1DB064; ROAP 24ALH; Task 008. EPA Grant No. R-800432.

Descriptors: *Sludge, *Waste disposal, *Sludge disposal, *Incineration, *Waste water treatment, *Treatment facilities, Municipal wastes, Industrial wastes, Ultimate disposal.
Identifiers: *Municipal sludges, *Utility coal ashes, Municipal incinerator residue.

The nature and disposal practices for municipal and utility sludges and ashes were studied. The study was primarily concerned with the sludges from municipal waste water, and water treatment plants, coal ash from power stations and grate residue from municipal incinerators. Each of these subject areas is presented in a separate report. Volume I of this series presents the summary for the results and conclusions developed for each of the subject areas. (See W76-00688 thru W76-00690) (EPA)
W76-00687

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES. VOLUME II - MUNICIPAL SLUDGES,
Dayton Univ. Ohio. Research Inst.
N. L. Hecht, D. S. Duvall, and A. S. Rashidi.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-033b, May 1975. 231 p, 65 fig, 85 tab, 202 ref. 1DB064; ROAP 24ALH; Task 008. R800432.

Descriptors: *Waste disposal, *Sludge, Economics, *Sludge disposal, Drying, *Waste water treatment, Treatment facilities, Municipal wastes, Ultimate disposal.
Identifiers: *Municipal sludges, Sludge handling, *Municipal wastewater.

A comprehensive characterization and evaluation was performed of disposal and utilization practices for sludges from municipal wastewater and water treatment plants. The nature and quantities of the of the sludges were discussed. Various sludge handling and treatment techniques were detailed. Problems encountered in sludge disposal were reviewed, and the economics of wastewater sludge disposal were discussed. (See also W76-00687) (EPA)
W76-00688

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES, VOLUME III - UTILITY COAL ASH,
Dayton Univ. Ohio. Research Inst.
N. L. Hecht, and D. S. Duvall.
Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-033C, May 1975. 66 p, 7 fig, 17 tab, 82 ref. 1DB064; ROAP 24ALH; Task 008. R800432.

Descriptors: *Coals, *Waste disposal, Pollution abatement, Industrial wastes, Sludge disposal, Solid wastes, Ultimate disposal.
Identifiers: *Utility coal ash, Generation rates, Energy requirements, *Coal ash wastes.

The residue from the burning of coal, collected from the stack effluent and the bottom of the boiler unit, is another solid waste disposal product that the community must be concerned with. Since 1940 more than 300 million tons of this coal ash has been generated, of which only about 30% has been utilized. The nature of coal ash has been defined, the quantities produced have been determined and the locations of the major utilities generating the coal ash have been established. In addition, the anticipated compositional changes and quantities to be generated in the future resulting from expanded energy requirements, advancements in technology and pollution controls have been evaluated. This study also included a review of current disposal and utilization practices. (See also W76-00687) (EPA)
W76-00689

CHARACTERIZATION AND UTILIZATION OF MUNICIPAL AND UTILITY SLUDGES AND ASHES. VOLUME IV - MUNICIPAL INCINERATOR RESIDUES,
Dayton Univ. Ohio. Research Inst.
N. L. Hecht, and D. S. Duvall.

Available from the National Technical Information Service, Springfield, Va 22161. Environmental Protection Agency, Report EPA-670/2-75-033d, May 1975. 58 p, 8 fig, 28 tab, 61 ref. 1DB064; ROAP 24ALH; Task 008. R800432.

Descriptors: Economics, *Incineration, Solid wastes, *Waste disposal, Ultimate disposal, *Municipal wastes.
Identifiers: Disposal practices, *Municipal incinerators.

The composition and current disposal practices for the residue resulting from the incineration of urban refuse have been studied. In addition, the characteristics of urban refuse are described, and the location and capacity of the nation's municipal incinerators specified. The economic and technical potential for utilizing materials recovered from the residue have also been studied. (See also W76-00687) (EPA)
W76-00690

DEMONSTRATED TECHNOLOGY AND RESEARCH NEEDS FOR REUSE OF MUNICIPAL WASTEWATER,
SCS Engineers, Long Beach, Calif.
For primary bibliographic entry see Field 5D.
W76-00692

COLUMN STUDIES OF SOIL CLOGGING IN A SLOWLY PERMEABLE SOIL AS A FUNCTION OF EFFLUENT QUALITY,
Wisconsin Univ., Madison Dept. of Soil Science.
For primary bibliographic entry see Field 5B.
W76-00721

SEWAGE DISPOSAL SYSTEMS,
E. Lesh.
United States Patent 3,701,428. Applied July 17, 1970. Issued October 31, 1972. Official Gazette of the United States Patent Office, Vol 903, No 5, p 1583, October 31, 1972.

Descriptors: *Sewage disposal, *Plastic pipes, *Septic tanks, *Patents, Sewerage, Construction materials, *Waste disposal.

A sewage disposal unit has been developed which comprises a plurality of flexible sewer pipes adapted to be connected at one end to the mains of a sewage disposal system, flexible plastic septic tank submerged in a body of water adjacent to the said sewage mains, and connections between the other ends of said flexible sewer pipes. The mains are connected for discharge through the plastic pipes into the flexible plastic septic tank which is supported and protected by the surrounding water in which it is submerged. (Sandoski-FIRL)
W76-00773

METHOD AND APPARATUS FOR CONVEYING SEWAGE,
For primary bibliographic entry see Field 5D.
W76-00844

METHOD AND APPARATUS FOR INCINERATING POLLUTED LIQUIDS AND MUD,
J. M. Pariel, and G. Robic.
Canadian Patent 940,379. Issued January 22, 1974. Patents/Brevets, Vol 102, No 4, p 270, January 22, 1974.

Descriptors: *Patents, *Equipment, Pollutants, *Incineration, *Liquid wastes, *Mud, Oxidation, *Waste water treatment, Waste disposal.

A method and apparatus for incinerating polluted liquids and mud are described. The pollutants are sprayed inside a reaction chamber in the presence of an oxidizer with a mixture formed by the mutual dispersion of non-miscible phase containing the pollutants and a liquid. (Merritt-FIRL)
W76-00846

DRAIN FOR WASTEWATER.
German Patent 2,248,970. Issued February 7, 1974. German Patents Abstracts, Vol 5, No 2, p 3, March, 1974.

Descriptors: *Engineering structures, Buildings, *Drainage engineering, *Plastics, *Patents, Water pollution treatment, *Waste water disposal, Drainage wells, *Drains.
Identifiers: Thermoplastics.

A patent has been issued for a drain for wastewater in the foundation of a building made of thermoplastic material and enclosed in the concrete. Leaking of underground water is prevented by a flexible collar on the drain which is supported by radial metal rods, embedded at one end in the drain and bent around the collar at the other end. (Murphy-FIRL)
W76-00847

SEWAGE DISPOSAL,
For primary bibliographic entry see Field 5D.
W76-00855

ANAEROBIC EFFLUENT TREATMENT,
For primary bibliographic entry see Field 5D.
W76-00856

LAND DISPOSAL OF EFFLUENT FROM A SANITARY LANDFILL,
Florida Univ., Gainesville. Dept. of Agricultural Engineering.
R. A. Nordstedt, L. B. Baldwin, and L. M. Rhodes.
Journal Water Pollution Control Federation, Vol. 47, No. 7, p 1961-1970, July 1975. 1 fig, 9 tab, 10 ref.

Descriptors: *Solid wastes, *Landfills, *Leachate, *Florida, Irrigation, Effluents, Liquid wastes, Irrigation effects, Path of pollutants, Reclaimed water, Water quality, Impaired water use, Waste disposal, Waste treatment, Waste water(Pollution), Disposal, Groundwater, Pastures, Soils, Nutrients, Chemicals, On-site investigations.
Identifiers: Land disposal.

About two-thirds of Florida is relatively flat land, generally with poor to very poor natural drainage. Consequently, sanitary landfills for many cities and counties are located in high water table areas. Before land disposal of effluent from a sanitary landfill may be used effectively, the impact on plants, soils, and groundwater should be evaluated. An excellent opportunity exists in Florida to improve unproductive land for other uses by sanitary landfilling. An unproductive low-lying area was reclaimed for pastureland by sanitary landfill on a sandy soil in a high water table area. Effluent from the trench method landfilling operation consisted of groundwater and leachate from previously filled trenches. The effluent was dispersed on nearby established pasture with a sprinkler irrigation system. No adverse effects on the soil or shallow groundwater were measured. Visual evaluation of the pasture grasses indicated an improvement in growth rate and appearance. (Sims-ISWS)
W76-00893

CHLORIDE CONTAMINATION IN ALUM CREEK, CENTRAL OHIO.
Ohio State Univ., Columbus. Dept. of Geology and Mineralogy.
For primary bibliographic entry see Field 5B.
W76-00910

PLANNING LAND APPLICATION OF MANURE,
Wisconsin Univ., Madison.
For primary bibliographic entry see Field 5B.
W76-00913

MONITORING ON-FARM WASTE MANAGEMENT SYSTEMS.
Iowa State Univ., Iowa City. Agricultural Extension Station.
For primary bibliographic entry see Field 5D.
W76-00914

HYDRAULIC HANDLING OF POULTRY MANURE INTEGRATED INTO AN ALGAL RECOVERY SYSTEM.
California Univ., Berkeley.
For primary bibliographic entry see Field 5D.
W76-00915

HEALTH ASPECTS OF POULTRY WASTE DISPOSAL,
Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio.
C. W. Chambers, and N. A. Clarke.
In: Second National Symposium on Poultry Industry Waste Management, University of Nebraska, Lincoln, May 19-20, 1964, p. 193-212. 18 ref.

Descriptors: *Poultry, *Farm wastes, *Waste disposal, *Public health, Bacteria, Fungi, Viruses, Diseases, Human diseases, Water pollution sources.

Interest in the disposal of poultry waste has stirred interest in the health aspects of poultry waste disposal. Many diseases are possibly communicable to man from poultry wastes. These diseases are caused usually by bacteria, fungi, or viruses. There are many avenues of transmission of the disease, such as direct contact with waste; ingestion of waste; inhalation of waste; and direct or indirect contact with vectors such as insects. Many diseases, such as those caused by the Salmonella species, can be transferred to man. To prevent the spread of disease, the poultry farmer should attempt to control conditions which result in multiplication of disease-producing organisms. The source of the disease-production should be eliminated if possible. The waste should be processed in a way which would breakdown the chain of infection. Above all, the poultry farmer should practice good management and remain rational about the subject of disease and disease potential. (Russell-East Central)
W76-00917

LAGOONS--SINK OR SWIM,
Brender's Leghorns, Ferndale, N.Y.
For primary bibliographic entry see Field 5D.
W76-00918

SYSTEMS AND SITUATIONS FOR HANDLING POULTRY WASTES,
Cornell Univ., Ithaca, N.Y. Dept. of Poultry and Science.
For primary bibliographic entry see Field 5D.
W76-00920

UNION OIL CO. V OPPEN: RECOVERY OF A PURELY ECONOMIC LOSS IN NEGLIGENCE (NOTE ON CASE ARISING FROM OIL SPILL).
For primary bibliographic entry see Field 6E.
W76-00924

NO DUMPING IN THIS OCEAN: NEARING THE END OF SHIP-GENERATED POLLUTION,
For primary bibliographic entry see Field 5B.
W76-00930

LEGAL MEASURES CONCERNING MARINE POLLUTION.
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00963

INTERNATIONAL OCEAN DUMPING OF INDUSTRIAL CHEMICAL WASTE,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00968

5F. Water Treatment and Quality Alteration

AN EVALUATION OF WATER REUSE FOR MUNICIPAL SUPPLY,
Southern Illinois Univ., Carbondale.
For primary bibliographic entry see Field 5D.
W76-00514

O AND M GUIDE FOR THE SUPPORT OF RURAL WATER-WASTEWATER SYSTEMS.
Conset, Inc., Washington, D.C. National Demonstration Water Project.
Commission on Rural Water, Chicago, Illinois, 1974, 283 p, 21 fig, 45 tab, 34 ref.

Descriptors: *Waste water treatment, *Sanitary Engineering, *Water treatment, *Management, *Marketing, Aeration, Flocculation, Oxidation, Coagulation, Filtration, Water supply, Treatment plants, Maintenance, Personnel management, Rural areas.
Identifiers: Handbooks.

Management of the support company is discussed from the start-up phase and organizational tasks, through the steady-state phase. Problems such as consumer complaints, and inspections are discussed. The water purification and distribution system operations are explained; technical terms are defined. The processes involved are delineated. Operation of a wastewater system is described. Waste disposal methods, and standards for purification are reviewed. Methods of monitoring the system are given. Skilled plant operators and their training are important. The job requirements and work loads for operators are discussed. Cost estimations of various parts of the system from equipment to power are presented. (Bradbeer-NWWA)
W76-00530

COMMON FUNDAMENTALS IN THE TECHNOLOGIES OF WATER AND WASTEWATER TREATMENT, (A VIZ-ES SZENNYVIZTITAS TECHNOLOGIAIAJAUAK KOZOS ALAPJAI),
For primary bibliographic entry see Field 5D.
W76-00561

DESIGNING WATER TREATMENT PLANTS AT THE CIVIL ENGINEERING CONSULTING FIRM MELYEPTERV (VIZTISZTITAS TERVEZES A MELYEPTIESI TERVEZO VALLALATNAE),
Melyepterv, Budapest (Hungary).
G. Peter.
Hidrologiai Kozlony, Vol 55, No 6, p 233-235, June, 1975.

Descriptors: *Water treatment, *Design criteria, *Treatment facilities, Potable water, Civil engineering, Engineering personnel, Reviews, Surface waters, *Foreign research, Waste water treatment, Europe.
Identifiers: *Hungary.

The accomplishments of the consulting engineering firm Melyepterv in Hungary as the first native firm to design water treatment plants are described. Until the 1950's all water treatment facilities in Hungary had been constructed by foreign corporations. With development in urbanization and industrialization, new problems of water management have occurred. Experiences with removal of suspended solids, and water softening and desalination for industrial plants, and design of facilities for potable water have been successful. Also, iron and manganese removal and the treatment of surface waters to a potable water quality have been achieved. Research and development has been carried out at Melyepterv in the operation of new facilities. Such technical knowledge has been applied to clarification, filtration, iron and manganese removal, and taste and odor control. A review is presented of the standardization and product development at this firm and the water treatment plants developed by Melyepterv over the past two decades for customers in Lebanon, Nigeria, Cuba, and Czechoslovakia. (Kramer-FIRL)
W76-00562

APPARATUS FOR DISSOLVING LARGE QUANTITIES OF OXYGEN IN WATER,
Naigai Kogyo Kabushiki Kaisha, Tokyo (Japan). (Assignee).
For primary bibliographic entry see Field 5D.
W76-00570

METHOD AND APPARATUS FOR MONITORING AND CONTROLLING HALOGEN LEVELS IN A WATER TREATMENT SYSTEM,
D. P. DeVale.
United States Patent 3,897,798. Issued August 5, 1975. Official Gazette of the United States Patent Office, Vol 937, No 1, p 86, August, 1975. 1 fig.

Descriptors: *Patents, *Water treatment, *Monitoring, *Halogens, Equipment, Electrodes, Pollutant identification.

A patented method and apparatus to monitor and control halogen levels in a water treatment system are detailed. Given that a particular halogen substance in liquid has a predetermined redox potential, a probe including a pair of capacitively coupled electrodes disposed in the liquid is used. The electrodes are periodically pulsed with a voltage pulse having a peak value slightly above the predetermined redox potential, to store a charge in the capacitance. The stored charge decays between pulses via the liquid between the electrodes at a rate determined by the content of the halogen. The charge is sensed across the electrodes by means that operate to generate a substance level indication signal. Additionally, display means respond to the substance level indication signal and provide a visual display of the substance content. (Kramer-FIRL)
W76-00576

AUTOMATIC SCUM REMOVAL TROUGH,
Harrisburg Steel Co., Pa.
For primary bibliographic entry see Field 5D.
W76-00578

SWITCHING VALUE FOR CONTINUOUS FILTERING DEVICES,
Agfa-Gevaert, Mortsel (Belgium).
For primary bibliographic entry see Field 8C.
W76-00586

SELF-CLEANING ROTARY FLUID FILTRATION SYSTEM,
For primary bibliographic entry see Field 5D.
W76-00587

DEVICE AND APPARATUS FOR TREATING LIQUIDS SUCH AS DRINKING WATER AND WASTE WATER,
P. Chapsal.
Canadian Patent 973,284. Issued August 19, 1975. Patent Office Record, Vol 103, No 33, p 82, August 19, 1975.

Descriptors: *Waste water treatment, *Water treatment, *Potable water, *Patents, Equipment, Water purification, Pumps.

A device for treating potable and waste waters has been patented. It comprises a tube which is immersed in the liquid to be treated. The tube is connected at its upper end with treating gas supply means. A diffuser having radial vanes fixed to a rotating disc communicates with the lower end of the tube. A pump, positioned under and coaxial with the diffuser, pumps the liquid from the tank through passages in the disc into chambers defined by the vanes. An emulsion of the gas and liquid is formed in the chambers and then ejected into the liquid in the tank. (Orr-FIRL)
W76-00589

CLOSED-LOOP OZONE GENERATING AND CONTACTING SYSTEM,
H. Lee, and H. M. Rosen.
Canadian Patent 973,285. Issued August 19, 1975. Patent Office Record, Vol 103, No 33, p 82, August, 1975.

Descriptors: *Patents, *Ozone, *Oxygen, Nitrogen, Carbon dioxide, *Water treatment, Recycling, Water purification.
Identifiers: Pressure swing fractionator.

A system has been patented by which water can be treated with ozone and/or oxygen in a closed-loop cycle. This conserves the high oxygen content gas. A pressure-swing fractionator has the dual functions of producing the necessary oxygen enriched gas for subsequent use and maintaining a low nitrogen level throughout the closed loop. This fractionator removes nitrogen, carbon dioxide, and water vapor from a feed gas to produce an oxygen enriched gas, which then flows to a contractor or an ozonator. The oxygen enriched gas from the ozonator contains from about one to seven percent ozone. This gas mixture is then contacted with water to be treated. Purified water is recovered, and excess oxygen rich gas (now at least partially depleted in ozone and/or oxygen and enriched in nitrogen) forms a recycle gas which is combined with a charge or air and flowed to the pressure-swing fractionator to begin another cycle. (Kramer-FIRL)
W76-00593

MEASUREMENT OF POWER INPUT IN FLOCCULATION,
Visvesvaraya Regional Coll. of Engineering, Nagpur (India).
A. G. Bhole, S. M. Dhabadgaonkar, and S. G. Tarnekar.
Journal of the Institution of Engineers (India), Vol 55, Part PH2, p 37-39, February, 1975. 5 fig, 1 tab, 11 ref.

Descriptors: *Water treatment, *Flocculation, *Measurement, Equipment, Turbidity, Analytical techniques.
Identifiers: *Speed regulation, *Velocity gradient.

In the treatment of water, flocculation is commonly utilized for removal of turbidity. When mechanical mixing is used to achieve flocculation, a proper coagulant dose is necessary. Velocity gradient (change in velocity per unit distance normal to the direction of velocity) has been accepted as a rational parameter. It is assumed that the performance of a field flocculator is the same as that in an (empirical) jar test of the velocity gradient. A method used in India is presented for measuring mean temporal velocity gradient by the power input technique. The Ward-Leonard method of speed control was used to regulate the speed of a 220 V dc and 0.75 amp universal motor, to which the flocculator shaft was attached. (Kramer-FIRL)
W76-00608

LARGE RURAL AREA ORGANIZES FOR POTABLE WATER,
Public Works, Vol 106, No 7, p 48-49, July, 1975. 1 fig, 1 tab.

Descriptors: *Administration, *Water distribution(Applied), *Water supply, *Rural areas, *Ohio, Construction, Cost comparisons, Pipelines, Pumping stations, Water costs, *Potable water, *Water districts.
Identifiers: Lorain County(Ohio).

A new rurlal water district, organized in Lorain County, Ohio, is one of the largest in the United States to be funded by the Farmers Home Administration (FHA). Formerly, costs of filling a private residential cistern were as high as $65 per month. In August 1973, the Rural Lorain County Water Authority was begun in order to integrate the area's water needs with the required financial and technical feasibility data. Public approval was gained by the distribution of a question-and-answer sheet concerning such matters as administration, project financing, size of mains, amount of water pressure to be provided, and amount of customers' water bills. Following this, hearings proceeded smoothly in the 16 political subdivisions. A program of construction was adopted to begin in August, 1975. Over 350 miles of pipe will be laid (over 360 sq m) for a distribution system, including storage and pumping stations to bring treated water from ten miles away at the town of Avon Lake. Estimated costs of constructing the piping, service connections, valves, tanks, pump stations and other facilities are detailed; the total will be about $11.5 million. A projection of costs to the average Lorain county subscriber indicate that each will pay an initial rate of $9.00 per month of 2000 gallons of water; the next 2000 gallons will cost $3.50 per thousand gallons, with $3.00 per thousand gallons charged after that. (Kramer-FIRL)
W76-00618

SPECIFICATIONS FOR GRANULAR FILTER MEDIA,
University Coll., London (England).
For primary bibliographic entry see Field 5D.
W76-00622

FOCUS-COMPREHENSIVE WATER RESOURCES MANAGEMENT,
URS Corp., New York.
For primary bibliographic entry see Field 5G.
W76-00623

THE FLOATING COVER: BEST WAY TO COVER A FINISHED-WATER RESERVOIR.
G. Dallaire.
Civil Engineering, ASCE, Vol 45, No 6, p 75-79, June, 1975. 4 fig.

Descriptors: *Water distribution, *Water treatment, *Reservoirs, Water pollution control, Potable water, Construction materials, Installation, Maintenance, Chlorination, Legislation.
Identifiers: *Hypalon floating cover.

In a water distribution system, the finished-water reservoir should be covered to prevent water quality deterioration due to animal or bird droppings, dust and air- borne contaminants, hydrocarbon exhausts, algal growth, and vandalism. About 10% of finished-water reservoirs are not covered, but use post chlorination or surveillance as a measure of amelioration. In cities where it was decided to cover their reservoirs, the choice was between a rigid (Wood, concrete, or aluminum) or floating (Hypalon) cover. The floating cover has been chosen in Charleston, South Carolina; Philadelphia, Pennsylvania; and Chillicothe, Ohio; these systems are detailed. Advantages of the floating cover are: low initial costs; little maintenance; 100% resistance to seismic disturbances; rapid installation; elimination of evaporation of water or chlorine; elimination of algae growth as well as taste and odor problems; and, flexibility in that any size or shape reservoir can be covered with a floating cover. While a rigid cover has a longer expected lifetime, its installation and maintenance costs are higher. In a rigid cover system, there is an air space between the water surface and the cover which must be kept well ventilated; in the floating system, the cover moves with the water level, keeping the reservoir water clean, and preventing chlorine and water treatment chemicals from evaporating. Federal pressure and state financial support have been given to cities wishing to cover their finished- water reservoirs, and the floating cover method presents a viable alternative. (Kramer-FIRL)
W76-00624

NATION'S CAPITAL FACES CRITICAL WATER PROBLEM.
For primary bibliographic entry see Field 5D.
W76-00627

HOW BAD IS OUR TAP WATER.
Water and Sewage Works, Reference Number, p R114, R119-R120, April 30, 1975.

Descriptors: *Water treatment, *Potable water, *Water quality control, *Treatment facilities, Personnel, Research and development, Surveys, *Public health, Tastes, Odors, *Vermont.
Identifiers: *Community Water Supply Study(PHS).

The Bureau of Water Hygiene, Environmental Health Service of the U. S. Public Health Service conducted a national Community Water Supply Study (CWSS) during 1969 in eight geographically distributed Standard Metropolitan Statistical Areas and the State of Vermont. The study included 969 water supply systems serving about 18.2 million people. It was designed to assess the status of potable water quality, water supply system facilities, and bacteriological surveillance programs. The principal findings of the study are presented. The results of the study led to eleven specific recommendations; these are also presented. Some of the recommendations include: research to determine the influence of residual organics on the development of tastes and organism regrowth in distribution systems; research to understand what causes problems of appearance or taste in an otherwise safe drinking water; development of a more practical technique for bacteriological surveillance; development of new analytical procedures to tailor treaement to solve a specific taste or odor problem; engineering research to simpligy and lower the cost of reducing the concentration of fluorides and nitrates and other inorganics; development of a continuous monitor for trace metals and corrosion products; monitoring of pressure in strategic locations in water systems; improvement of water systems by installation of adequate pumps, reservoirs and backflow prevention devices; and, enlargement of existing water treatment plant personnel training program. (Orr-FIRL)
W76-00628

CONTROL OF WATER QUALITY IN TRANSMISSION AND DISTRIBUTION SYSTEMS,
Roanoke County Public Service Authority, Salem, Va.
W. L. Rossie, Jr.
Journal of the American Water Works Association, Vol 67, No 8, p 425-427, August, 1975. 7 ref.

Descriptors: *Water distribution(Applied), *Distribution systems, Water conveyance, Water quality control, Baseline studies, Monitoring, Personnel, Operation and maintenance, Stress.

Water utility operators should be able to understand and anticipate stresses on a water distribution system. To control possible adverse effects from such stresses, the operator must prevent exposure, plan for emergency, discover stresses involved and modify conditions with this information, and, understand the interrelationship of variables and how to control them. The external environmental stresses that affect the internal environment of a distribution system include: insufficient treatment at point of procedure; open reservoirs; new construction; line breaks; cross connections; and, disaster operations. Each of these stresses is discussed. Monitoring of a water supply is very important. Tests for alkalinity, taste and odor, pH, turbidity, bacteria, chlorine residual, pressure readings, color, carbon dioxide, hardness, iron, and manganese should be performed to provide a routine check on the quality of water and background values. The use of baseline maps to plot background data quickly identifies abnormal readings that require more investigation. It is concluded that a distribution system is a living functional unit subject to stresses. Quality in design and construction and protective measures depend on quality materials and personnel. Adequate protective means are vital for stabilized operation and quality water in distribution systems. (Orr-FIRL)
W76-00633

EVALUATION OF STATE DRINKING-WATER-QUALITY SURVEILLANCE PROGRAMS,
Environmental Protection Agency, Atlanta, Ga. Region IV.
D. H. Taylor, and G. D. Hutchinson.
Journal of the American Water Works Association, Vol 67, No 8, p 428-431, August, 1975. 5 tab, 11 ref.

Descriptors: *Water supply, *Water quality, *Water quality control, Potable water, Water quality standards, Public health.
Identifiers: Water supply surveillance.

The important water supply conditions found in the States of Tennessee, Kentucky, Georgia, and Florida were summarized. The state water supply programs that provide for public health and engineering surveillance were also characterized. Three general classes of water supply systems were identified: community water systems; small community water systems; and, private, individual systems. A cross-section of the water supply field in each state was selected for study. The effectiveness of each state's water supply program was determined to a large extent on the bases of potable water quality, adequacy and condition of water system facilities, and water supply surveillance. The data showed great similarity between the status of the water supply field in the four states. Public health surveillance in the four states was not adequate to ensure continuous, safe drinking water. Lack of engineering inspection of system facilities was another common failure. Water system operation was found to be deficient in all states evaluated. Those facilities staffed with trained and certified operators were better water systems. Failure to maintain a chlorine residual throughout the distribution system was a common problem. It is concluded that the state legislatures, the administrative levels of state government, and the water supply field need to make strong commitments to restore and widen the margins of safety that water supplies provide in the southeast U. S. Safe and adequate water supplies will depend on the use of higher water utility service standards and regulation, surveillance, and enforcement by public environmental protection control agencies (Orr-FIRL)
W76-00634

DESALTERS SOW SEEDS FOR SAUDI INDUSTRY.
For primary bibliographic entry see Field 3A.
W76-00636

ORGANIC CONTAMINANTS IN WATER SUPPLIES.
American Water Works Association, New York. Committee on Organic Contaminants.
For primary bibliographic entry see Field 5A.
W76-00647

ION EXCHANGE WATER TREATMENT,
French Patent 2187-703. Issued February 22, 1974. French Patents Abstracts, Vol. 5, No. 11, February, 1974.

Descriptors: *Patents, *Ion exchange, *Demineralization, Automation, Beds, *Water treatment, Streams, *Water softening, Desalination.
Identifiers: Resins beds, Ion exchange plants.

An ion exchange plant for softening and demineralizing water is described. Part of the resin bed is periodically set aside for regeneration and then returned to the bed. Water for treatment is directed down through a first section of the resins bed, then turned and redirected up through a second section, at the top of which resin can be separated off for regeneration. Subsequently it is reintroduced at the top, upstream end of the first section. Even when fully automated, this plant does not require complex controls. (Prague-FIRL)
W76-00850

CARCINOGENS COMPLICATE CHLORINE QUESTION,
For primary bibliographic entry see Field 5B.
W76-00946

FLUORIDE POLLUTION,
National Research Council, Washington, D. C.
For primary bibliographic entry see Field 5C.
W76-00975

5G. Water Quality Control

CITIZEN ENFORCERS: INFLUENCING WATER RESOURCES ALLOCATION DECISIONS,
Georgia Inst. of Tech., Atlanta. Inst. of Government.
J. O. Smith.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-246 199, $8.75 in paper copy, $2.25 in microfiche. Georgia Environmental Resources Center, Atlanta, Report No ERC1175, August 1975, 283 p, 2 append. OWRT A-044-GA (1). 14-31-0001-4010.

Descriptors: *Water law, Water quality standards, Water pollution, Common law, *Federal Water Pollution Control Act, *Georgia, *Social participation, Decision making, *Public rights, Administrative decisions, Land use, Planning.
Identifiers: Federal water law, Georgia water law, Effluent standards, Administrative law, Legal standing, Citizen suits, Rulemaking, Private attorney general, *Public participation, Public interest.

The public citizen is portrayed in the context of his or her function as a private attorney general or enforcer of water resources protection statutes. Opportunities for this kind of involvement, derived primarily from the Federal Water Pollution Control Act Amendments of 1972, are listed and explained. Common law actions which are avialable to protect Georgia's Water resources are summarized both to demonstrate the vaibility of this source of water quality protection and to reveal its inadequacies and weaknesses, which modern statutes are designed to cure. Technical language, that is, legal jargon, has been eliminated through paraphrasing wherever possible to ennance the value of the report to lay audience to whom it is primarily directed. Federal and state administrative procedure statutes are explained, with emphasis on provisions of most significance to citizens. A summary and explanation of the most important provisions of the Federal Water Pollution Control Act Amendments of 1972 and regulations adopted under it form the major part of the report. A practical view of state administrative procedure is presented in the context of a discussion of the Georgia Coastal Marshlands Protection Act of 1970.
W76-00505

ASSESSMENT AND DEVELOPMENT PLAN FOR MONITORING OF ORGANICS IN STORM FLOWS,
Raytheon Co., Portsmouth, R.I.
For primary bibliographic entry see Field 5A.
W76-00507

WATER QUALITY STUDIES.
Environmental Protection Agency, Cincinnati, Ohio. Office of Water Programs.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-237 586, $11.50 in paper copy, $2.25 in microfiche. Report EPA-430/1-74-007, May, 1974. 446 p.

Descriptors: *Water pollution control, *Water quality control, Training, *Surveys, Water pollution sources, Bioassays, Bacteria, Bioindicators, Chemical analysis, Water analysis, Analytical techniques, Statistics, Aquatic life, Data collections, On-site data collections.
Identifiers: Water pollution surveys, *Training manuals(Water pollution).

This training manual is designed for persons having responsibilities for planning and working in water pollution surveys. The chapter on sources of pollutants covers the pollutional characteristics of domestic waste waters, the sources and effects of industrial wastes, the influence of land runoff on water quality, irrigation return flow and agricultural runoff, and an overview on thermal pollution. Planning and conducting water quality surveys is explained in terms of organizing a stream survey, organizing a lake or impoundment survey, flow measurement, tracing natural water, sampling, sample handling, bacterial sampling, and the role of the bacteriologist in water quality surveys. The section on data handling and reporting includes: introduction to statistics; presentation of data; presentation and interpretation of bacteria data; preparation of survey reports; and the EPA Storet system. The aquatic environment, the identification of aquatic organisms, using benthic biota in water quality evaluation, biological field method, special applications and procedures for bioassay, and aquatic organisms of significance in pollution surveys are covered in the section on aquatic biology. The chemistry section explains the common water analysis tests. Bacteriological indicators of water pollution, analysis of coliform and fecal streptococcus groups, determination of bacterial pollution, and membrane filter techniques are discussed in the section on bacteriology. Dissolved oxygen and oxygen relationships are the topic of another section. Aerial reconnaissance in pollution surveillance and case preparation and courtroom procedure are also discussed. (Orr-FIRL)
W76-00513

BIBLIOGRAPHY OF HYDROLOGY, CANADA, 1971-1973.
International Association of Hydrological Sciences, Ottawa (Ontario).
For primary bibliographic entry see Field 10C.
W76-00532

HYDROLOGY AND WATER RESOURCES, A SYLLABUS OF REFERENCES FOR TEACHING INTRODUCTORY COURSES IN THE WATER ENVIRONMENT.
National Committee for the International Hydrological Decade, Washington, D.C.
For primary bibliographic entry see Field 10C.
W76-00536

EROSION IN THE URBAN ENVIRONMENT,
Johns Hopkins Univ., Baltimore, Md.
For primary bibliographic entry see Field 2J.
W76-00546

SALINITY POLICY FOR COLORADO RIVER BASIN,
Colorado State Univ., Fort Collins. Dept. of Agricultural Engineering.
G. V. Skogerboe, and W. R. Walker.
Journal of the Hydraulics Division, Proceedings of American Society of Civil Engineers, Vol 101, No HY8, Paper 11510, p 1067-1075, August 1975. 1 fig, 13 ref, append.

Descriptors: *Salinity, *Water management(Applied), *Water policy, *Water quality control, *Colorado River basin, *Return flow, Strip mines, Irrigation, Saltation, Colorado River compact, Mexican water treaty, State governments.

Salt concentration and pickup by water, flowing in the Colorado River basin, creates problems for areas in the lower basin. The water quality goal for the Colorado River of maintaining salinity concentrations in the lower stem at or below present levels (nondegradation salinity policy) has considerable merit, because specific contracts and treaties guarantee water quantities to states in the basin and to Mexico. The nondegradation salinity policy should be applied to each state, not by setting numerical standards, but by offsetting salinity detriments resulting from each new development with salinity control measures that will maintain a net salt leaving state boundaries. Salinity detriments from one water-use sector (e.g., coal strip mining or oil shale development) could be mitigated by investing in salinity control measures in another water-use sector (e.g., improvements in existing irrigation systems). A flexible state policy will result in improved water management that will facilitate water development. (Lardner-ISWS)
W76-00553

PREDICTION OF ASSIMILATION CAPACITY IN RECEIVING STREAMS, PART I,
Oklahoma State Univ., Stillwater. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5B.
W76-00600

PREDICTION OF ASSIMILATION CAPACITY IN RECEIVING STREAMS, PART II,
Oklahoma State Univ., Stillwater. Dept. of Civil Engineering.
For primary bibliographic entry see Field 5B.
W76-00601

GREEN BAY SELF-PURIFIES ALGAL NUTRIENTS,
Wisconsin Univ., Madison.
For primary bibliographic entry see Field 5C.
W76-00615

USING HYDROGEN PEROXIDE FOR POLLUTION CONTROL.
For primary bibliographic entry see Field 5D.
W76-00616

SALINITY CONTROL AND FEDERAL WATER QUALITY ACT,
Bureau of Reclamation, Denver, Colo. Water Quality Office.
M. B. Bessler, and J. T. Maletic.
Journal of the Hydraulics Division, Proceedings of ASCE, Vol 101, No HY5, p 581-594, May, 1975. 6 fig, 1 tab, 17 ref, 1 append.

Descriptors: *Saline water, Saline water intrusion, Rivers, Administration, Refining, Salinity, Legislation, Water quality control, Water supply, *Water quality act, Water pollution control.
Identifiers: *Colorado River Water Quality Improvement Program(CRWQIP), *Salinity control.

Salinity is considered as a chemical or mineral pollutant under the Federal Water Quality Act and is receiving increased attention in the western U.S. Salinity and the adequency of basin water supplies is becoming a major economic issue in the Colorado River Basin. The overall planning strategy of the Colorado River Water Quality Improvement Program (CRWQIP) and some of its inherent limitations in meeting water quality goals are discussed. The Colorado River International Salinity Control Project is a comprehensive effort which demonstrates that salinity control planning must consider many complex interrelated factors from natural hydrologic variations and man-made changes to internation relations and legislation reflecting public policy. The five categories of control that are presently being studied under the CRWQIP include: river system management; point source control; diffuse source control; irrigation source control; and, return flow utilization. If full water resource development is attained, then the point and diffuse source controls as identified in the CRWQIP will not be sufficient to meet salinity objectives established by the states and the EPA. Planning will be directed toward a Total Water Management concept which involves the following: integrating water resources management and land-use planning; planning and controlling of interrelated structures and physical features; examining and evaluating the existing systems, institutions, and legal requirements; displaying alternative plans to examine quality and quantity impacts within a river basin; and, deriving efficient operational and management modes for the river system. (Orr-FIRL)
W76-00617

ENVIRONMENTAL ASPECTS--SACRAMENTO BANK PROTECTION,
Army Engineer District, Sacramento, Calif. Water Resources Planning Branch.
For primary bibliographic entry see Field 4D.
W76-00621

FOCUS-COMPREHENSIVE WATER RESOURCES MANAGEMENT,
URS Corp., New York.
C. A. Kohlhaas.
Water and Sewage Works, Vol 122, No 6, p 70-75, June, 1975. 1 fig, 7 ref.

Descriptors: Water resources, *Water resources development, *Administration, *Comprehensive planning, Water supply, Alternate planning, Alternative water use, *Hydrologic cycle, Water supply, Water treatment, Waste water treatment, Project planning.
Identifiers: Generalized water balance diagram.

The increasing demand for water supply and concern for pollution-free receiving waters require a comprehensive approach to the planning of water resources. A generalized water balance diagram is the key to comprehensive planning. Concepts emphasized include non-point source pollution problems. The diagram is based on the natural hydrological cycle that begins with precipitation, runoff, and evaporation to the atmosphere, leading to precipitation and a repeat of the cycle, and on the cycle of the use of water resources by man, their degradation through use, and their reclamation and ultimate reuse. The purposes of the diagram are: to provide general guidelines for water resources and environmental planning; to identify specific optionf for meeting water supply, waste disposal, and waste water reclamation goals; and, to provide for the evaluation of specific water resources alternatives. The generalized water balance diagram consists of several systems and subsystems: available supply system; surface stream system; evaporation; water supply and waste disposal system; water use-reuse system; groundwater system; reservoir system: subsystems of water supply sources; subsystem of storage; water treatment subsystem; waste water treatment subsystem; flood retention sybsystem; recreational impoundment subsystem; industrial use subsystem; and, miscellaneous use subsystem. The use of the diagram is illustrated by several examples. (Orr-FIRL)
W76-00623

TROUBLE IN PARADISE,
Clark Univ., Worcester, Mass. Dept. of Environmental Affairs.
H. E. Schwarz, and M. R. Eigerman.
Journal of the Hydraulics Division, Proceedings of ASCE, Vol 101, No HY5, p 603-612, May, 1975. 3 tab.

Descriptors: *Water quality control, *Water management(Applied), Administration, Water pollution control, *Massachusetts, Public benefits, Engineering, Environmental effects, *Planning, Social impact.
Identifiers: Merrimack Valley(Mass).

Overall planning problems for water quality control and waste water management are discussed. Social impacts are difficult to evaluate, and rather than a behind the desk data-gathering process, the Merrimack Wastewater Management Study was undertaken by interviewing local people in 15 surrounding towns and cities in this rural Massachusetts area. A matrix chart was used to record local issues and concerns, which was divided into vertical columns of 'plan actions' and horizontal rows of 'impact categories.' The plan actions were: water quality; water quantity; water supply; collection systems; treatment residuals; planning and design; construction; land modification; capital cost funding; private abatement actions; and operations. The 18 impact categories included: population; commercial fisheries; employment; housing; recreation; land use; municipal services; municipal finances; political process; and public health. The study of the Merrimack Valley area was designed to inventory the local people for their problems and needs; to translate the messages received from the matrix into engineering terms so as to get feedback from the citizens as to the most important issues; to compare the matrices for all 15 surrounding communities; and to make and implement real engineering and management alternatives. (Kramer-FIRL)
W76-00625

NATION'S CAPITAL FACES CRITICAL WATER PROBLEM.
For primary bibliographic entry see Field 5D.
W76-00627

THE FEDERAL CONSTRUCTION GRANT PROCESS FROM A (BILENE) TO Z (ANESVILLE),
Environmental Protection Agency, Washington, D.C. Office of Water Program Operations.
J. T. Rhett.
Water and Sewage Works, Reference Number, p R20, R22-R24, R27-R28, April 30, 1975. 5 fig.

Descriptors: *Waste water treatment, *Financing, *Government finance, *Grants, Local governments, State governments, Legislation, Costs, Planning, Federal Water Pollution Control Act, *Treatment facilities.
Identifiers: PL 92-500, Federal Water Pollution Control Ace Amendments.

The ground rules for the investment of public funds for sewers and treatment facilities are primarily set forth in the regulations published in the Federal Register in February of 1974. However, the procedural requirements are only broadly sketched. The step by step activities of applying for federal funds are explained in this article. A rough outline of each step is presented in flowchart form. The steps include: preapplication activity; step one or facility planning which takes from 6 to 12 months; step two or facility design which takes from 6 to 12 months; step 3 or construction which takes from 2 to 4 years; and operation and maintenance which continues for the plant life or 25 to 30 years. The following types of Federal aid are available: grants for various planning activities; technical assistance, especially for facility design and construction and for enforcement; technical information from Federal research, demonstration and monitoring; training for State and local personnel; and environmental Financing Authority to help local governments raise their share of the costs of treatment facilities; and, a larger Federal share of costs to a uniform 75 percent. (Orr-FIRL)
W76-00629

ESTIMATING INDIRECT COST OF URBAN WATER USE,
Koebig and Koebig, Inc., Los Angeles, Calif.
For primary bibliographic entry see Field 3D.
W76-00630

FINLAND'S CLEANUP CAMPAIGN,
J. Josephson.
Environmental Science and Technology, Vol9, No 8, p 710-711, August, 1975.

Descriptors: *Water pollution control, *Pollution abatement, *Legislation, *Financing, Pulp and paper industry, Biochemical oxygen demand, Phosphorus, Nitrogen, Industrial wastes, Municipal wastes, Energy, Monitoring, Water quality control, Standards.
Identifiers: *Finland.

The International Bank for Reconstruction and Development has granted a 15 yr loan of $20 million to finance a water pollution control program in Finland. This is the first pollution control loan ever granted by the World Bank. The water consumption and waste water production per capita in Finland are among the highest in the world, due to the large forest products and pulp and paper industries. Water protection is generally regarded as having the highest priority in the field of environmental pollution control in Finland. Finnish authorities spend about $56 million/yr on municipal waste water treatment. Within the next five years, 90% of the municipal waste water should be effectively cleaned. Water use and cleanup in Finland are regulated by its Water Act of 1961, which prohibits blocking, changing, or spoiling water courses without a permit. The National Board of Waters is administering a cleanup program that stresses BOD7, phosphorus, and nitrogen. The NBW conducts a monitoring program for discharges and ambient water quality. About 15 consulting firms are approved by the NBW to perform monitoring work for individual industries. The only environmental standards in Finland are those for water. An Air Protection Act and a Noise Abatement Act are being drafted by the Ministry of the Interior's Division for Environmental Protection. A Waste Management Act is also beind drafted. Laws concerning oil damages, environmental poisons, and biocides are already in force. Projects to recover and use waste heat from industry to provide space heating for buildings are examples of Finland's philosophy that the more completely fuel, materials, and heat are used, the less waste matter and energy are left to pollute. (Orr-FIRL)
W76-00631

CONTROL OF WATER QUALITY IN TRANSMISSION AND DISTRIBUTION SYSTEMS,
Roanoke County Public Service Authority, Salem, Va.
For primary bibliographic entry see Field 5F.
W76-00633

A STRATEGY FOR WATER POLLUTION CONTROL IN BRITAIN,
For primary bibliographic entry see Field 5D.
W76-00638

OTTAWA PLAYS KEY ROLE IN TECHNOLOGY TRANSFER,
Environmental Protection Service, Ottawa, (Ontario).
For primary bibliographic entry see Field 5D.
W76-00643

A FOURTH DIMENSION--RECREATION AND AMENITY,
For primary bibliographic entry see Field 6B.
W76-00644

THE REVOLUTION IN WATER MANAGEMENT,
R. C. Rittenhouse.
Power Engineering, Vol 79, No 8, p 28-35, August, 1975. 2 fig, 2 tab.

Descriptors: *Water management(Applied), *Power system operation, *Water reuse, Legislation, Federal Water Pollution Control Act, Environmental effects, *Cooling towers, Thermal power, Thermal pollution, Water pollution control.
Identifiers: *Closed-cycle colling system.

Water management and its influence on all aspects of power generation is discussed. Because of the Federal Water Pollution Control Act Amendments of 1972, all new plants must conform to EPA guidelines or must convert to a closed-cycle cooling system. The field of environmental management is rapidly growing, and a multidisciplinary staff includes: chemists, biologists, meteorologists, physicists, mathematicians, and socio-economists, as well as civil, mechanical, and chemical engineers. With this approach, the functions of cost-benefit analyses and the solving of specific technical problems may best be implemented. Industry objections to the new EPA guidelines have been that stringent legislation fails to recognize differences in the location, design and requirements for the operation of individual power plants. The largest protesting group was the Utility Water Act Group (UWAG), which opposed most strongly the guidelines for thermal effluents. Costs versus benefits of control measures are discussed, and a possible change in water pollution control policies which might take place between the 1977 and 1983 compliance deadlines is recommended. Specific problems of various facilities, including dry and hybrid cooling towers, cooling ponds and lakes, and spray ponds and canals are detailed. Also considered are new business opportunities in water and waste management, as a result of new applications of reuse. (Kramer-FIRL)
W76-00648

STORM WATER MANAGEMENT MODEL: DISSEMINATION AND USER ASSISTANCE,
University City Science Center, Philadelphia, Pa.
J. A. Hagarman, and F. R. S. Dressler.
Environmental Protection Agency, Report EPA-670/2-75-041, May 1975. 46 p, 23 fig, 13 tab, 10 ref, append. 1BB034 ROAP: ATA Task 020. R-802716.

Descriptors: Water quality control, Mathematical Models, Rainfall, Surface runoff, Waste water treatment, Erosion control, Water pollution, Control, Storm water, Model studies, *Information exchange, Computer programs, Data storage and retrieval, Computer models.
Identifiers: Stormwater management, Urban stormwater, *Storm water management model.

A program of dissemination and user-assistance for the EPA Storm Water Management Model (SWMM) has been developed and implemented. Services available to SWMM users include distribution of the SWMM program itself and technical assistance in problem delineation, data preparation, execution debug, and output interpretation. Costs of this service extend only to actual computing costs. Several case studies of SWMM applications completed with UCSC assistance in the past year included in this report. These studies include a combined sewer overflow problem in Binghamton, New York; a land use plan in the Stony Brook basin in Princeton, New Jersey; and RUNOFF/TRANSPORT calculations on the Wingohocking basin in Philadelphia, Pennsylvania. The UCSC SWMM dissemination program is now self-sustaining and continues to assist the user community. (EPA)
W76-00678

FLOW ESTABLISHMENT AND INITIAL ENTRAINMENT OF HEATED WATER SURFACE JETS,
Minnesota Univ., Minneapolis. St. Anthony Falls Hydraulic Lab.
For primary bibliographic entry see Field 5B.
W76-00679

ACQUISITION AND CULTURE OF RESEARCH FISH: RAINBOW TROUT, FATHEAD MINNOWS, CHANNEL CATFISH, AND BLUEGILLS,
Bureau of Sport Fisheries and Wildlife, Columbia, Mo. Fish-Pesticide Research Lab.
J. L. Brauhn, and R. A. Schoettger.
Available from the National Technical Information Service Springfield, Va 22161. Environmental Protection Agency Report EPA-660/3-75-011, May 1975. 45 p, 4 tab, 83 ref. 1BA021. EPA-LAG-0153(D).

Descriptors: *Freshwater fish, *Quality control, Feeding rates, Water quality, *Rainbow trout, *Channel catfish, Fish diseases, Pesticide residues, Water quality control, Water pollution control.
Identifiers: *Fathead minnows, Bluegill sunfish, Genetic stocks.

Rainbow trout (Salmo gairdneri), channel catfish (Ictalurus punctatus), fathead minnows (Pimephales promelas), and bluegills (Lepomis macrochirus) are cultured widely for toxicological research. However, vacillant or extreme cultural conditions are sometimes suspected of comprising the test animals and, thus, results of comparative or confirmatory research. Because exact optimum conditions for indoor maintenance and culture of the four species are not well defined, standardized practices were adopted that are intended to reduce cultural conditions to a common variable status. Water quality, nutrition, genetic variation, diseases, fish handling, gross behavior, and required facilities are discussed. Well known propagation techniques provide the basis for the intensive care methods used. Special emphasis is given to diets, diet preparation, and residues of pesticides or other contaminants in diets and fish. (EPA)
W76-00680

EVALUATION OF HEALTH HAZARDS ASSOCIATED WITH SOLID WASTE/SEWAGE SLUDGE MIXTURES,
East Tennessee State Univ. Johnson City, Tenn. Dept. of Health Sciences.
For primary bibliographic entry see Field 5E.
W76-00681

ADVANCED AUTOMATIC CONTROL STRATEGIES FOR THE ACTIVATED SLUDGE TREATMENT PROCESS,
Systems Control, Inc., Palo Alto, Calif.
For primary bibliographic entry see Field 5D.
W76-00693

REHABILITATION OF LAND DISTURBED BY SURFACE MINING COAL IN ARIZONA,
Arizona Univ. Tucson. Dept. of Watershed Management.
T. R. Verma, and J. L. Thames.
Journal of Soil and Water Conservation, Vol 30, No 3, p 129-131, May-June, 1975. 3 fig, 5 tab, 5 ref.

Descriptors: *Strip mines, *Revegetation, *Landscaping, *Arid lands, *Land reclamation, *Arizona, Coal mines, Land forming, Contours, Erosion control, Land management, Vegetation establishment, Watershed management, Conservation, Ranges, Hydrology, Erosion, Slopes, Range management, Grazing, Range grasses, Soil conservation, Soil moisture, Water quality.
Identifiers: Surface coal mining, Land disturbance, Recontouring, Black Mesa(Ariz).

Preliminary results are presented of a study on the effects of mining operations on mined-area hydrology and the effectiveness of reclamation efforts in the southwest. Water is the factor that determines how well disturbed lands can be rehabilitated. The problem is maximizing the advantages and minimizing the threat of erosion. Recontouring mined land results in land which has a greater soil depth and a high hydrologic potential. The reclaimed watershed also has great potential, not only for erosion control and restoration of the landscape to its original condition, but also for use as rangeland. If proper grazing practices can be maintained, preliminary results indicate long-lasting and productive rehabilitation can be achieved on Black Mesa's disturbed watersheds. (Robinett-Arizona)
W76-00709

ANIMAL WASTE MANAGEMENT WITH POLLUTION CONTROL.
Ohio Agricultural Research and Development Center, Annual Report, NC-93 October 1974, 27 p, 9 fig, 12 tab, 6 ref.

Descriptors: *Lagoons, Economics, *Odor, *Ohio, Soils, Agricultural runoff, *Farm wastes, Hogs, Rates of application, Groundwater, Water quality, Water pollution control, Waste disposal.
Identifiers: Waste management, *Composting, *Land disposal.

The Agricultural Engineering Department continued to evaluate handling swine waste with flushing and a two stage lagoon system. Experimental objectives were: to determine the treatment efficiency of the system, measure the nitrogen losses in each unit, determine whether ground water pollution occurs from the lagoons, and to evaluate the system with respect to equipment system effectiveness, and economics. In another experiment, a built-up bed, aerobic composter was designed to provide both treatment and storage capability. Evaluations of rate of application, type and condition of manure, temperatures achieved within the composting mass and resultant compost quality and condition are in progress. Other projects underway include livestock waste systems and studies of malodorous substances and their abatement. The Agronomy Department has installed field lysimeters to determine the maximum rate of cattle manure that can be applied to various Ohio soil types without adversely affecting groundwater quality. Cooperative research has been initiated through a Memorandum of Understanding between the Ohio Agricultural Research and Development Center and USDA-ARS-North Appalachian Experimental Watershed, Coshocton, Ohio. Numerous watersheds are available to study runoff from pastures and feedlots. Cow herds will be managed under 3 systems: (1) limited stocking rate and fertilizer application with grazing during the growing season only; (2) high stocking rate and fertilizer application with year-long grazing and; (3) moderate fertility and stocking rate with hay fed on pasture during winter. Cattle will be fed in drylot with varying proportions of concentrates and roughages. Runoff, ground water and soil sediments will be analyzed for N, P, K, BOD, etc. where applicable. (East Central Oklahoma State)
W76-00714

AGRICULTURAL WASTE MANAGEMENT,
American Society of Civil Engineers, New York. Environmental Engineering Div.

Journal of the Environmental Engineering Division, American Society of Civil Engineers, Vol 100, No EE1, p 1-6, February, 1974. 1 fig.

Descriptors: *Return flow, *Waste water(Pollution), Wastes, Agriculture, Irrigation, Irrigation practices, Irrigation effects.

Since the practice of irrigation has detrimental effects on water quality, irrigation return flows must be considered an agricultural waste. The major water quality problem is increased salt concentration in the return flows as a result of the pickup of minerals from the soils and the loss of water through evapotranspiration. Irrigated agriculture is the largest consumer of water resources, and return flows constitute a large portion of the flow in many western streams. Salt concentrated by evapotranspiration must be leached from the root zone to continue crop production. This necessity of leaching to maintain a salt balance concentrates salts in the return flows and causes damage downstream. (Skogerboe-Colorado State)
W76-00744

A GENERAL PLAN FOR THE URBAN DEVELOPMENT OF MOSCOW AND TASKS RELATED TO WATER HYGIENE AND SANITARY PROTECTION OF WATER RESERVOIRS (GENERAL' NYY PLAN RAZVITIYA MOSKVY I ZADACHI GIGIYENY VODY I SANITARNOY OKHRANY VOKOYEMOV),
For primary bibliographic entry see Field 5D.
W76-00783

AID TO MUNICIPALITIES FOR WATER SUPPLY, POLLUTION ABATEMENT AND SEWER SEPARATIONS.
For primary bibliographic entry see Field 6E.
W76-00789

THE SHORTEST TIME SEQUENCE OF HEAVY RAINFALL AND ITS EFFECT ON STORMWATER RETENTION TANKS (DIE KUERZESTE ZEITFOLGE VON STARKREGEN UND THRE AUSWIRKUNG AUF REGENBECKEN),
For primary bibliographic entry see Field 2A.
W76-00798

EVALUATION OF SURFACE WATER RESOURCES FROM MACHINE-PROCESSING OF ERTS MULTISPECTRAL DATA,
Indiana State Univ., Terre Haute. Dept. of Geography and Geology.
P. W. Mausel, W. J. Todd, M. F. Baumgardner, R. A. Mitchell, and J. P. Cook.
Journal of Environmental Quality, Vol 3, No 4, p 316-321, October-December, 1974. 5 fig, 1 tab.

Descriptors: *Water pollution control, *Water pollution, Water management, Water quality, Water quality control, Environmental control, Monitoring, Hydrology.
Identifiers: *Earth Resources Technology Satellite, Multispectral scanner.

Water resource data that are useful to environmental scientists and planners frequently are missing, incomplete, or obtained irregularity. A new source of surface hydrological information can be obtained as often as every 18 days in some areas through machine-processing of Earth Resources Technology Satellite (ERTS) multispectral scanner data. This research focused on the surface water resources of a large metropolitan area, Marion County (Indianapolis), Indiana, in order to assess the potential value of ERTS spectral analysis to water resources problems. The results of the research indicate that all surface water bodies over 0.5 ha were identified accurately from ERTS multispectral analysis. Five distinct classes of water were identified and correlated with parameters which included the (1) degree of water siltiness; (2) depth of water; (3) presence of macro and micro biotic forms in the water; and (4) presence of various chemical concentrations in the water. (Skogerboe-Colorado State)
W76-00833

NERC 74, ANNUAL REPORT.
National Environmental Research Center, Cincinnati, Ohio.
EPA Report, EPA-670/9-75-002, March 1975. 98 p, 93 fig, 8 tab, 9 ref.

Descriptors: *Research and development, *Waste treatment, *Federal government, Research facilities, Projects, Investigations, Waste water (pollution), Waste water treatment, Wastes, Solid wastes, Hazards, Pollutants, Water pollution, Environmental effects, Environmental control, Water supply, Water resources, Waste disposal, Sewage treatment, Industrial wastes, Toxicity, Air pollution, Laboratory tests, Analytical techniques, Heavy metals, Oil spills, Mine wastes, Recycling, Quality control, Methodology, Asbestos, Leachate, Control.

The budget, staff, programs and activities, and facilities of the National Environmental Research Center (NERC) in Cincinnati were described in the 1974 annual report. Included were reports on functions and projects of NERC research laboratories, including Advanced Waste Treatment, Environmental Toxicology, Industrial Waste Treatment, Methods Development and Quality Assurance, Solid and Hazardous Waste, and Water Supply. Other current studies described were: (1) binding of heavy metal pollutants by polyuronic acids, (2) use of coal mine refuse and fly ash as a road base material, (3) identification of organic pollutants with computerized gas chromotography/mass spectrometry, (4) control of landfill leachate by biological treatment methods, and (5) asbestos in drinking water. (Robinson - ISWS)
W76-00879

THE BOUNDARY WATERS TREATY OF 1909: DOES IT PROVIDE AN ENVIRONMENTAL CAUSE OF ACTION,
For primary bibliographic entry see Field 6E.
W76-00926

CITIZEN SUITS SPUR COURT PROBES OF ENVIRONMENTAL IMPACT.
For primary bibliographic entry see Field 6E.
W76-00956

RIVER DEFENSE COMMITTEE V. THIERMAN (ACTION UNDER NEPA TO COMPEL A PUBLIC HEARING BEFORE ISSUING PERMIT).
For primary bibliographic entry see Field 6E.
W76-00980

BOONE V. TILLATOBA CREEK DRAINAGE DISTRICT (SUIT SEEKING INJUNCTIVE RELIEF WITH RESPECT TO PROPOSED DRAINAGE PROJECT).
For primary bibliographic entry see Field 6E.
W76-00981

GARDINIER, INC. V. FLA. DEPT. OF POLLUTION CONTROL (PETITION FOR WRIT OF CERTIORARI TO DETERMINE THE VALIDITY OF AN ORDER OF THE DEPARTMENT OF POLLUTION CONTROL).
For primary bibliographic entry see Field 5B.
W76-00982

LEGAL ASPECTS OF PHOSPHATE MINING IN NORTH CAROLINA,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6G.
W76-00984

TANKERS AND THE MARINE ENVIRONMENT, PART I.
For primary bibliographic entry see Field 5B.
W76-00985

6. WATER RESOURCES PLANNING

6A. Techniques Of Planning

MODEL DEVELOPMENT AND SYSTEMS ANALYSIS OF THE YAKIMA RIVER BASIN, MACRO MODEL SIMULATION.
Washington Univ., Seattle, Dept. of Civil Engineering.
For primary bibliographic entry see Field 4A.
W76-00503

STUDIES ON OPERATIONS PLANNING AND CONTROL OF WATER DISTRIBUTION SYSTEMS,
Systems Control, Inc., Palo Alto, Calif.
D. W. Bree, Jr., A. I. Cohen, L. C. Markel, and H. S. Rao.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-246 198, $5.75 in paper copy, $2.25 in microfiche. Completion Report, August 1975. 128p, 36 fig, 30 ref. OWRT C-5214(No 4212) (1). 14-31-0001-4212.

Descriptors: *Distribution systems, *Simulation analysis, Operations, Planning, *Control, *Optimization, Pumping, Networks, *Water allocation(Policy), *Model studies.
Identifiers: *Operations planning, Network analyses.

The studies were conducted in three parts. In the first part, a field experiment was performed to validate a model for extended period simulation of water distribution systems. The experiment and its results are discussed. In the second part, a three level hierarchical model was developed for operations planning and control of water distribution systems. The three levels, namely the monthly, daily and the hourly level, address source or pump scheduling with a shorter time horizon, but on a more detailed and refinde system model. The monthly and daily models provide support to the hourly model in determining set points for pump source scheduling. Each model is of direct use in its own right for operations planning. Preliminary numerical results are presented for optimizing pumping operation in the system using an experimental code. The thrid and final part presents preliminary results on reduced order representations of distribution networks. (See also W74-05533)
W76-00506

URBAN STORMWATER MANAGEMENT MODELING AND DECISION-MAKING,
Florida Univ., Gainesville. Dept. of Environmental Engineering Sciences.
For primary bibliographic entry see Field 5D.
W76-00695

THE ROLE OF GROUNDWATER IN THE OPTIMUM UTILIZATION OF WATER RESOURCES,
Guadalquivir Project, Madrid (Spain).
For primary bibliographic entry see Field 4B.
W76-00815

MODELS FOR GROUNDWATER ANALYSIS,
Harvard Univ., Cambridge, Mass.
For primary bibliographic entry see Field 4B.
W76-00816

SIMULATION MODELS FOR CONJUNCTIVE USE OF SURFACE AND GROUNDWATER,
Harvard Univ., Cambridge, Mass.
For primary bibliographic entry see Field 4B.
W76-00817

APPLICATION OF SYSTEMS ANALYSIS MODELS TO THE PROBLEM OF CONJUNCTIVE USE OF SURFACE AND GROUNDWATER IN THE VEGA OF GRANADA,
Instituto Geologico y Minero de Espana, Madrid.
For primary bibliographic entry see Field 4B.
W76-00818

COMPUTATION OF ECONOMIC DATA CONCERNING THE EXPLOITATION OF GROUNDWATER ON A REGIONAL SCALE,
Northern Sahara Water Resources Study Project, Alger (Algeria).
For primary bibliographic entry see Field 4B.
W76-00819

SOME ASPECTS OF GROUNDWATER EXPLOITATION AND THE USE OF GROUNDWATER MODEL IN THE MIRES BASIN IN CRETE, GREECE.
For primary bibliographic entry see Field 4B.
W76-00820

SYSTEM FOR EXPLOITATION OF THE 'COMMON HERITAGE OF MANKIND' AT THE CARACAS CONFERENCE,
Ministry of Foreign Affairs, Nairobi (Kenya). Legal Div.
A. O. Adede.
American Journal of International Law, Vol 69, No 1, p 31-49, 1975. 35 ref.

Descriptors: *United Nations, *Law of the Sea, *Negotiations, *International law, United States, Oceans, Political aspects, Legal aspects, Federal government, Administrative agencies, Governmental interrelations, Exploitation, Exploration, Mining, Treaties, Underwater, International waters.
Identifiers: *International agreements, *Seabeds.

The work of the First Main Committee of the Third United Nations Conference on the Law of the Sea is examined, with particular emphasis on the proper system of exploitation and exploration of the seabed beyond the limits of national jurisdiction. The center of attention is draft Article Nine, entitled 'Who May Exploit the Area', several formulations of which had been drafted in preparation for the Conference. The delegates' negotiations on Article Nine, they exemplify the divergent positions of developed and developing nations on issues concerning exploitation of the deep seabed and subsoil. Major issues at the Conference included: (1) whether there should be a single or multiple system of exploitation and exploration of seabed; (2) the proper role to be played by the proposed International Sea-bed Authority, and the degree of control which the Authority should be permitted to exercise over such activities; and (3) whether detailed rules and regulations concerning seabed activities should be written into the proposed Convention itself, as opposed to incorporating only a framework of general norms to guide the Authority. Recommendations are presented for future discussions, and an alternative text is proposed. (Schilling-Florida)
W76-00933

STATE OF OHIO EX REL. BROWN V. CALLAWAY (ACTION BY STATE TO ENJOIN CONSTRUCTION OF TWO RESEARVOIRS).
For primary bibliographic entry see Field 6E.
W76-00951

PIERCE V. RILEY (ACTION BY RIPARIAN OWNERS FOR INJUNCTION TO PROVIDE ACCESS TO LAKE).
For primary bibliographic entry see Field 4A.
W76-00976

CHIPOLA NURSERIES, INC. V. DIVISION OF ADMINISTRATION, DEPARTMENT OF TRANSPORTATION (APPEAL OF EMINENT DOMAIN PROCEEDING FOR VIOLATION OF NEPA).
294 So. 2d 357 (Fla App 1974).

Descriptors: *Eminent domain, Condemnation, *Right-of-way, *Economics, *Judicial decisions, Environmental effects, Florida, Legislation, Environment, Highway effects, Environmental control, Ecology, Alternate planning, Project planning, Management, Water resources development.
Identifiers: *National Environmental Policy Act, *Florida Air and Water Pollution Control Act.

Certiorari was sought in the First District Court of Appeal to review an order of taking entered in an eminent domain proceeding by the lower court. The petitioners alleged that the Department of Transportation failed to properly consider the costs, environmental factors, area planning, and alternate routes to the right of way granted and that the respondent has failed to comply with the National Environmental Policy Act (NEPA) of 1969 and with the Florida Air and Water Pollution Control Act (FAWPCA). The court held that the actions by the Department of Transportation did not constitute an oppressive exercise of its authority and that the evidence failed to establish any violation of the NEPA, the FAWPCA or the Federal Aid Highways Act. (Proctor-Florida)
W76-00979

RIVER DEFENSE COMMITTEE V. THIERMAN (ACTION UNDER NEPA TO COMPEL A PUBLIC HEARING BEFORE ISSUING PERMIT).
For primary bibliographic entry see Field 6E.
W76-00980

BOONE V. TILLATOBA CREEK DRAINAGE DISTRICT (SUIT SEEKING INJUNCTIVE RELIEF WITH RESPECT TO PROPOSED DRAINAGE PROJECT).
For primary bibliographic entry see Field 6E.
W76-00981

6B. Evaluation Process

HYDROLOGY FOR ENGINEERS AND PLANNERS,
Missouri Univ., Columbia. Dept. of Civil Engineering.
For primary bibliographic entry see Field 2A.
W76-00531

AN OCEANOGRAPHIC RESEARCH PROGRAM FOR THE CONTINENTAL SHELF OFF THE SOUTHEASTERN UNITED STATES.
Division of Biomedical and Environmental Research (USERDA), Washington, D.C.
For primary bibliographic entry see Field 2L.
W76-00533

HYDROLOGY AND WATER RESOURCES, A SYLLABUS OF REFERENCES FOR TEACHING INTRODUCTORY COURSES IN THE WATER ENVIRONMENT.
National Committee for the International Hydrological Decade, Washington, D.C.
For primary bibliographic entry see Field 10C.
W76-00536

FOCUS-COMPREHENSIVE WATER RESOURCES MANAGEMENT,
URS Corp., New York.
For primary bibliographic entry see Field 5G.
W76-00623

TROUBLE IN PARADISE,
Clark Univ., Worcester, Mass. Dept. of Environmental Affairs.
For primary bibliographic entry see Field 5G.
W76-00625

A FOURTH DIMENSION--RECREATION AND AMENITY,
J. Humphries.
Clean Air, Vol 5, No 18, p 7-12, Summer, 1975.

Descriptors: *Recreation demand, *Water management(Applied), Water resources, Legislation, Sewage treatment, Water utilization, Water users, Water pollution control, Water demand, Water districts, Regional development.
Identifiers: Regional Water Authorities(Great Britain).

A discussion is presented on the use of water resources in Great Britain specifically for recreational purposes and the management of such waters for this purpose. While the Government's three priorities in the reorganization of water services have been securing an adequate clean water supply for the needs of people and industry, provision of enough sewerage and sewage disposal facilities, and cleaning up of most of the rivers by the 1980's, a fourth aim has been added to the national water strategy. This is that water should be viewed as an environmental amenity, for both conservation and recreation. The number of people participating in water-based leisure activities has been increasing in England and Wales and it has been proposed as governmental policy that the amenity use of water space should be protected and promoted at both a regional and a national level. Regional Water Authorities have taken over the functions of River Authorities, responsible for land drainage, pollution control water resources, fisheries, and water recreation; Local Authorities, responsible for public water supply; and Sewage and Sewerage Authorities. The ten regional Water Authorities are defined in terms of areas and populations; their functions in terms of fisheries, recreation, and amenities are also detailed. (Kramer-FIRL)
W76-00644

A LAND USE DECISION METHODOLOGY FOR ENVIRONMENTAL CONTROL,
Rocky Mountain Center on Environment, Denver, Colo.
K. Wickersham, R. P. Hansen, and A. G. Melcher.
Available from the National Technical Information Service, Springfield, Va 22161, as PB-244 239, $7.00 in paper copy, $2.25 in microfiche. Environmental Protection Agency, Report EPA-600/5-75-008, March 1975. 180 p, 7 tab, 162 ref, 4 append. 1HA098. R802423.

Descriptors: *Land use, Environment, Ecology, Legislation, Water Resources, Planning, Analytical techniques, Zoning, Ecosystems, Decision making, Environmental control, Planning, Social aspects.
Identifiers: Land Use Controls, Model Land Use Legislation.

An ecologically responsible land use decision-making system is proposed for local, regional and, to an extent, state governments. Referred to as LUDMS, it is based on conclusions that local governments have not dealt effectively with land use problems because traditional planning and land use control devices are unecological, unresponsive and unsystematic. The fundamental premise of LUDMS is that environmentally responsible land use planning and control must be

based on valid ecological information combined with enlightened and informed public opinion. LUDMS makes use of several basic concepts, including policy planning (a process for combining public opinion with scientific and technical information to create community policies); use of an interdisciplinary team; public participation; an environmental resources inventory and analysis; a staff which understands and can communicate about ecology; legal devices for land use control; and positive community programs. 'Model' state and local codes for implementing LUDMS are provided. (EPA)
W76-00683

ARIZONA STATE WATER PLAN, PHASE I: INVENTORY OF RESOURCE AND USES,
Arizona Water Commission, Phoenix.
D. Gerke, J. Linkswiler, E. Nemecek, F. Tevebaugh, and M. Wurbs.
July, 1975. 232 p, 48 fig, 31 tab, 137 ref, 5 append.

Descriptors: *Arizona, *Water resources, *Water utilization, *Water supply, *Water requirements, *Water demand, Water law, Water conservation, Groundwater resources, Hydrology, Surface waters, Water management(Applied), Water policy, Water resources development, Planning, State governments, Overdraft, Potential water supply, Economics, Human population, Streams, Rivers, Bibliographies, Groundwater.
Identifiers: *Water problems, Arizona State Water Plan.

The Arizona Water Commission is developing a State Water Plan in the following three phases: (1) an inventory of the resource, current uses and associated problems; (2) an identification and description of alternative futures available to the state; and (3) an evaluation of potential water resource management plans. The series of studies will provide the physical and economic information required for the people of the state, local planners, and legislators to make rational decisions concerning management of Arizona's water. This pollution is the first phase of the plan which presents a status report on the state's water resources, a look at the present situation, and an evaluation of today's water problems. Information is given on existing water uses and supplies, population, economy, water law, and major water problems and needs. Also included in the study are schematic diagrams of rivers and streams in Arizona, crop distributions, theoretical depletions, and records of U.S. Geological Survey stream gaging stations in Arizona. The report provides a single source of available information for the nontechnical user, a display of regionalizations and summarizations for the broad scope planner, and a bibliography of data available for detailed investigation. (Robinett-Arizona)
W76-00700

EXECUTIVE SUMMARY OF CRITICAL WATER PROBLEMS FACING THE ELEVEN WESTERN STATES.
Bureau of Reclamation, Washington, D.C.
April 1975. 85 p, 36 fig, 2 tab.

Descriptors: *Comprehensive planning, *Planning, *Forecasting, *Coordination, *Water demand, *Water utilization, Southwest U. S., Pacific Northwest U. S., *Water policy, *Water allocation(Policy), Management, Long-term planning, Future planning(Projected).
Identifiers: *Western U. S.

This Executive Summary is supported by a comprehensive report which presents in detail the results of the Westwide Study. Generally the summary follows the outline and content of the report and presents in concise terms the highlights and significant conclusions and recommendations of the report. The major contribution that these two reports can make is to define and influence the scope and character of future Federal and State water resources investigations of the West through the year 1985. The present and near future critical water resources problems and issues of the West are clearly outlined. (See also W76-00717) (OWRT)
W76-00716

WESTWIDE STUDY REPORT ON CRITICAL WATER PROBLEMS FACING THE ELEVEN WESTERN STATES.
Bureau of Reclamation, Washington, D.C.
April 1975. 457 p, 67 fig, 153 tab.

Descriptors: *Comprehensive planning, *Planning, *Forecasting, *Coordination, *Water demand, *Water utilization, Southwest U. S., Pacific Northwest U. S., *Water policy, *Water allocation(Policy), Management, Long-term planning, Future planning(Projected).
Identifiers: *Western U. S.

The goal of this study effort, as outlined in Chapter I, Study Purpose, History and Approach, has been the development of adequate information upon which to base future significant decisions relative to the water and related resources of the 11 Western States. Chapter II, The Westwide Situation, provides an assessment of the present setting on water and land resources, population, economy, environment, minerals and energy. Chapter III, Aspects of the Future, examines various important factors which will influence water planning in the Westwide area with emphasis on year 2000. Chapter IV, Westwide Problems, discusses critical problems that are common to most of the 11 Western States. Chapter V, Regional Problems, presents critical problems that affect large geographic areas involving two or more States. Chapter VI, State Specific Problems, sets forth critical problems, more closely identified with individual State conditions. In the latter three chapters, various approaches to problem resolution are discussed, conclusions drawn, and recommendations made for supplemental or new studies were considered appropriate. Chapter VII, General Observations, synthesizes and consolidates the multitude of conclusions and recommendations. (See also W76-00716) (OWRT)
W76-00717

PROCEEDINGS, CONFERENCE ON WATER REQUIREMENTS FOR LOWER COLORADO RIVER BASIN ENERGY NEEDS.
Arizona State Fuel and Energy Office (Phoenix).
For primary bibliographic entry see Field 6D.
W76-00745

GROUNDWATER SEMINAR, GRANADA.
Food and Agriculture Organization of the United Nations, Rome (Italy).
For primary bibliographic entry see Field 4B.
W76-00807

GROUNDWATER RESOURCES: EVALUATION AND EXPLOITATION,
Arizona Univ., Tucson. Dept. of Geoscience.
For primary bibliographic entry see Field 4B.
W76-00812

WATER RESOURCES OF WASHINGTON, A BIENNIAL REPORT TO THE LEGISLATURE, JANUARY 1975.
Washington State Dept. of Ecology, Olympia.
Biennial report, January 1975. 33 p, 5 fig, 3 tab.

Descriptors: *Water resources, *Washington, *Water supply, *Water rights, *Comprehensive planning, Planning, Management, State governments, Financing, Legislation, Lgal aspects, Water law, Water resources development, Surface waters, Groundwater, Irrigation, Industries, Hydroelectric power, Municipal water, Domestic water, Water utilization, Water shortage, River basins.

The Water Resources Act of 1971 directed Washington's Department of Ecology to develop a comprehensive state water resources program. For planning and management purposes, the state has been divded into 23 river basins plus the main stem of the Columbia River. Separate policy is being developed for each basin, and statewide policies are being created to deal with critical problems requiring consistent management. A water Resources Information System was established to serve as an archive of state water resources data. Surface water, groundwater, and saline water supply available in Washington was presented here, and existing use of water for domestic, municipal, and industrial supply was described. Irrigation accounts for 65% of total withdrawals from surface and groundwater sources, and current projections indicate irrigated acreage in the state will increase 50% by the year 2000. It was concluded that the existing water supply in Washington is inadequate or only marginally adequate to provide both instream needs and diversion requirements. The multitude of laws and treaties governing water rights in the state were explored, and several recommendations for changes in the state water code were made. Financial aspects of water resources development were discussed. A color map of federal and non-federal development projects was included. (Robinson - ISWS)
W76-00880+

STATE OF OHIO EX REL. BROWN V. CALLAWAY (ACTION BY STATE TO ENJOIN CONSTRUCTION OF TWO RESEARVOIRS).
For primary bibliographic entry see Field 6E.
W76-00951

TOWN OF ISLIP V. POWELL (ACTION TO ENJOIN RENTING DOCK FACILITIES).
For primary bibliographic entry see Field 6E.
W76-00955

CITIZEN SUITS SPUR COURT PROBES OF ENVIRONMENTAL IMPACT.
For primary bibliographic entry see Field 6E.
W76-00956

ARTIFICIAL ISLANDS: POSSIBILITIES AND LEGAL PROBLEMS,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00965

RIVER DEFENSE COMMITTEE V. THIERMAN (ACTION UNDER NEPA TO COMPEL A PUBLIC HEARING BEFORE ISSUING PERMIT).
For primary bibliographic entry see Field 6E.
W76-00980

MARINE TOWING, INC. V. RED STAR TOWING AND TRANSPORTATION CO. (ACTION FOR DAMAGES SUFFERED WHEN TUG STRUCK A WRECK IN NAVIGABLE WATERS).
For primary bibliographic entry see Field 6E.
W76-00983

6C. Cost Allocation, Cost Sharing, Pricing/Repayment

HOW TO ANALYZE INFILTRATION/INFLOW,
Environmental Protection Agency, Cincinnati, Ohio.
For primary bibliographic entry see Field 5D.
W76-00566

ESTIMATING INDIRECT COST OF URBAN WATER USE,
Koebig and Koebig, Inc., Los Angeles, Calif.
For primary bibliographic entry see Field 3D.
W76-00630

HIGHER PROFITS VIA ADVANCED INSTRUMENTATION,
Liptak Associates, Stamford, Conn.
For primary bibliographic entry see Field 5D.
W76-00635

AN INTEGRATED POWER PROCESS MODEL OF WATER USE AND WASTE WATER TREATMENT IN CHLOR-ALKALI PRODUCTION,
Houston Univ., Tex. Dept. of Quantitative Management Science.
For primary bibliographic entry see Field 5D.
W76-00707

ELECTRONIC COMPUTATION OF QUANTITIES AND COSTS FOR SEWERAGE SYSTEMS CONSTRUCTION (MASSENERMITTLUNG UND KOSTENBERECHNUNG IM KANALISATIONSBAU MIT ELEKTRONISCHEN DATENVERARBEITUNGSANLAGEN),
For primary bibliographic entry see Field 5D.
W76-00796

COMPUTATION OF ECONOMIC DATA CONCERNING THE EXPLOITATION OF GROUNDWATER ON A REGIONAL SCALE,
Northern Sahara Water Resources Study Project, Alger (Algeria).
For primary bibliographic entry see Field 4B.
W76-00819

DISAPPROVAL OF THE DEFERRAL OF WATER POLLUTION CONSTRUCTION GRANT FUNDS.
Hearing--Subcommittee on Environmental Pollution, Committee on Public Works, U.S. Senate, 94th Congress, 1st Session, February 28, 1975. 101 p, 4 fig, 5 tab.

Descriptors: *Project planning, *Sewage treatment, *Treatment facilities, *Grants, Decision making, Administrative decisions, Employment, Construction, Planning, Legislation, Federal project policy, Federal government, United States, Water pollution, Public utilities, Judicial decisions, Federal Water Pollution Control Act.
Identifiers: *Funding(Federal), Environmental Protection Agency(EPA), *Federal Water Pollution Control Act Amendments.

In 1972 Congress authorized $18 billion for sewage treatment plants and related facilities. Half of this money, $9 billion, was Presidentially impounded before being ordered released by the Supreme Court. This Senate hearing was scheduled to consider a resolution disapproving the deferral of water pollution construction grant funds. Several water pollution and sewage treatment experts testified that not only could the amount released be put to quick and effective use, but much greater amounts as well. Delays in funding the sewage treatment construction were named as the reason for state lack of faith in the program, and for much inefficiency in state planning of sewage treatment projects. The experts said that immediate release of the money would have many beneficial effects, including the completion of a backlog of projects which have had to be postponed, and a 'ripple' effect on unemployment in states where the construction industry has been faltering. Since some states have fully committed their 1974 funds and a major portion of their 1975 funds, full allocation of the $9 billion will allow them to continue making progress toward achieving the goals of the 1972 Amendments. (Parrish-Florida)
W76-00986

6D. Water Demand

ESTIMATING INDIRECT COST OF URBAN WATER USE,
Koebig and Koebig, Inc., Los Angeles, Calif.
For primary bibliographic entry see Field 3D.
W76-00630

A TOWNSHIP'S NEED OF FILTERED WATER,
Tata Iron and Steel Co., Ltd, Jamshedpur (India). Town Engineering Dept.
For primary bibliographic entry see Field 3D.
W76-00641

A FOURTH DIMENSION--RECREATION AND AMENITY,
For primary bibliographic entry see Field 6B.
W76-00644

ARIZONA STATE WATER PLAN, PHASE I: INVENTORY OF RESOURCE AND USES,
Arizona Water Commission, Phoenix.
For primary bibliographic entry see Field 6B.
W76-00700

PROCEEDINGS, CONFERENCE ON WATER REQUIREMENTS FOR LOWER COLORADO RIVER BASIN ENERGY NEEDS.
Arizona State Fuel and Energy Office (Phoenix).
Available from Office of Arid Lands Studies, Univ. of Arizona, Tucson, Arizona 85719, for $10.00. Held at University of Arizona, Tucson, May 8-9, 1975, 344 p.

Descriptors: *Energy, *Water requirements, *Colorado River Basin, *Water demand, Water supply, Water utilization, Water management(Applied), Water quality, Geothermal studies, *Industrial production, *Competing uses, Oil shales, Arizona, *Southwest U.S., Planning, Environmental effects.
Identifiers: Coal gasification, Solor energy, Lower Colorado River Basin.

The conference was designed to provide the latest technical data on the management of water and energy needed to produce new energy sources in the Lower Colorado River Basin and relate this to the cost of maintaining the present environment. Of particular interest at the Conference was the realization that it takes energy, as well as water, to extract energy. Therefore, the papers delivered assessing new energy technology--oil shale, coal gasification, geothermal, and solar--accounted for both requirements. (See W76-00746 thru W76-00761)
W76-00745

OVERVIEW OF WATER REQUIREMENTS FOR ELECTRIC POWER GENERATION, (FOR THE LOWER COLORADO RIVER BASIN),
California Univ., Los Angeles. Inst. of Geophysics and Planetary Physics.
G. C. Jacoby, Jr.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975

Descriptors: *Water requirements, *Water supply, *Water demand, *Water shortage, *Water management(Applied), *Electric power industry, Economics, Water allocation(Policy), Water resources development, Water utilization, Water resources, Groundwater resources, Arid lands, Imported water, Overdraft, Water conservation, Water sources, Water distribution(Applied), *Colorado River Basin, Colorado River, Electric power production, Planning, *Energy, Water consumption.

The Lower Colorado River Basin region is consuming water faster than the annual replenishment rate. Augmentation, which is frequently mentioned as a solution, has the problems of legal ownership, costs and negative physical effects. The electrical power generation industry is planning to increase its production and water use and has plans to provide most of their water requirements for the next decade which will consequently take away from the overall supply for all other users. It is now time to shift to careful demand management in regard to both water and electrical energy. This management could be achieved through revised pricing, revised statutes and re-evaluations of beneficial consumptive use. (See also W76-00745) (Robinett-Arizona)
W76-00746

WATER USE AS A FACTOR IN MEETING ELECTRIC POWER NEEDS,
Salt River Project, Phoenix, Ariz.
R. F. Durning.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 48-65. 8 fig, 1 ref.

Descriptors: *Water utilization, *Water conservation, *Cooling water, *Water requirements, *Electric power industry, Recirculated water, Water allocation(Policy), Water demand, Water shortage, Arid lands, Water supply, Economics, Water sources, *Colorado River Basin, Electric power production, Water shortage, Cooling towers, Heated water, Reasonable use, Cooling, Heat transfer, Ventilation, Costs, Efficiencies, Energy.
Identifiers: Air cooling, Wet-dry cooling.

Water use for cooling by electric power generators is investigated and methods for more efficient use or for alternative cooling designs are described. There is a potential for lowering the water requirements of present energy production by the use of the wet-dry cooling tower or to reduce them to nearly zero by employing a straight dry system. These schemes, however, invoke moderate to substantial economic penalties to the cost of producing electrical power and of further concern is that these less efficient heat rejection methods result in a poorer utilization of already depleting energy supplies. Cooling designs described include a once-through system to a natural water body, evaporative cooling towers, man made water bodies, air cooling(dry system), and wet-dry cooling. (See also W76-00745) (Robinett-Arizona)
W76-00747

WATER FOR ENERGY AS RELATED TO WATER RIGHTS IN THE COLORADO RIVER BASIN,
Arizona Water Commission, Phoenix.
W. E. Steiner.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 66-79.

Descriptors: *Water requirements, *Electric power industry, *Water utilization, *Water supply, *Water rights, *Energy, Water allocation(Policy), Water demand, Water shortage, Reasonable use, Water management(Applied), Electric power production, Economics, Water resources development, Water resources, Arid lands, Water sources, Water distribution(Applied), *Colorado River Basin, Colorado River, Planning, Competing uses, Water law, Colorado River Compact, Agriculture.

The most fundamental of the laws governing water use in the Basin (the Colorado River Compact drafted over 50 years ago), is described and the breakdown of legal water entitlements is given. Energy development in both the upper and lower Colorado River Basins may soon be in competition with agriculture for available water resources. If allocation decisions are made strictly on the basis of economics, energy production will be the winner and sufficient water supplies will be ob-

tained by the energy industry to meet their needs throughout the Basin. The area has water resources sufficient to support any desirable level of energy resource development. (See also W76-00745) (Robinett-Arizona)
W76-00748

WATER AND ENERGY REQUIREMENTS FOR AN OIL SHALE INDUSTRY,
Atlantic Richfield Corp., Los Angeles, Calif.
L. B. Rothfeld.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 81-105. 5 fig, 4 tab, 4 ref.

Descriptors: *Water requirements, *Water supply, *Electric power production, *Oil shales, Electric power industry, Water utilization, Reasonable use, Economics, Water resources, Water sources, *Colorado River Basin, Colorado River, Planning, Competing uses, Oil, Oil industry, *Colorado, Projections, *Energy.
Identifiers: Piceance Basin(Colo), Grand Valley(Colo).

The most active area of oil shale development has been the Piceance Basin in Colorado, in which the Colony Development Operation Plant, between Rifle and Grand Junction, is described in terms of the mining and refinery technique and water and energy requirements. Present water use by the current Colony design is about 11,800 acre-feet per year (16.5 cfs) and with a projected ten-fold increase by the mid-1980's, water use would be about 118,000 acre-feet 1 year (165 cfs). The average flow of the Colorado River at Grand Valley is 3600 cu. ft./second and the requirements of the Colony plant and associated developments amount to less than 0.5% of the average flow of the river at the Colony pump station. The industry itself, directly or indirectly can supply the fuel needed for the power generating stations plus about ten times that quantity of fuel for other purposes. (See also W76-00745) (Robinett-Arizona)
W76-00749

A PRELIMINARY ANALYSIS OF THE ENERGY AND WATER REQUIREMENTS FOR DEVELOPING GEOTHERMAL ENERGY IN ARIZONA,
Arizona Univ., Tucson. Dept. of Geosciences.
D. L. Norton, and T. M. Gerlach.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 106-121. 4 fig, 1 tab, 3 ref.

Descriptors: *Electric power production, *Water requirements, *Geothermal studies, *Water supply, *Arizona, Thermal water, Electric power industry, Water utilization, Economics, Water resources, Water sources, *Colorado River Basin, Planning, Competing uses, Geophysics, Water shortage, Costs, Arid lands, Heated water, Efficiences, Desalination, Saline water, Potable water, *Energy.
Identifiers: *Geothermal energy, Geothermal reservoirs, Energy requirements.

There are several regions in Arizona that have very high potential for the discovery of conventional geothermal reservoirs. Geothermal energy, unlike most other energy alternatives, does not require extensive mining, refinement, packaging, transportation, or surface storage of fuel, and, as a consequence, land, energy, and people remain available for other activities. Geothermal energy based power systems have 2 distinct advantages over current energy production: (1) Resource development and delivery to the plant site consume small amounts of energy, and (2) the recovery of the resource has a minor impact on man's environment. Water is also a natural by-product of geothermal energy use. Desalination plants coupled to the geothermal fields could produce about 50% of the potable water for the region. A 2000 megawatt geothermal energy development would require about 2% of the total water used in Arizona. (See also W76-00745) (Robinett-Arizona)
W76-00750

WATER AND ENERGY REQUIRED TO OPERATE COAL GASIFICATION FACILITIES AND WASTE WATER TREATMENT REQUIREMENTS,
El Paso Natural Gas Co., Tex.
P. Milios.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 122-132. 1 fig.

Descriptors: *Water requirements, *Water supply, *Coal mines, *Waste water treatment, *Natural gas, Coal mine wastes, Water pollution, Water demand, Economics, Water allocation(Policy), Water utilization, Water resources, Arid lands, Water conservation, Water sources, Colorado River, Planning, Efficiencies, Water reuse, Recirculated water, *New Mexico, *Energy, Water consumption(Except consumptive use).
Identifiers: Lurgi coal gasification, El Paso Natural gas, *San Juan River(NMex), Energy requirements.

A coal gasification plant using Lurgi coal gasification technology that the El Paso Natural Gas corporation is planning to build in the Four Corners Area of New Mexico is discussed. The first plant will require 10,357 acre-feet per year of water from the San Juan River (a tributary of the Colorado) and will produce 275 billion Btu of synthetic pipeline gas. A water requirement of one gallon for each 27 thousand Btu includes providsions for mining coal, excluding electric power for the mine, for electric power and steam generation to run the plant, for a potable water system for the plant, and for supplying hydrogen for the gasification reactions. A detailed description of water reuse in the coal gasification process is given. Of the total water entering the process plant, including water contained in the coal as moisture, 67% evaporates, 24% is consumed via chemical reaction, 2.5% leaves the ammonia by-product, and the remaining 6.5% leaves the plant in flue gases, ash, and cooling tower drifts. (See also W76-00745) (Robinett-Arizona)
W76-00751

WATER AND ENERGY REQUIREMENTS TO MINE, PROCESS, AND REPROCESS NUCLEAR FUELS,
Arizona Univ., Tucson. Dept. of Nuclear Engineering.
R. L. Seale.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 133-150. 7 fig, 2 tab, 5 ref.

Descriptors: *Water requirements, *Water utilization, *Nuclear powerplants, *Electric power production, Water resources, *Water demand, Economics, Costs, Efficiencies, Nuclear reactors, Electric power, Water cooling, *Energy, Cooling water, Cooling towers, Heated water, Water consumption.
Identifiers: Energy requirements.

About 8% of the present electrical generating capacity in this country is in the form of nuclear generating plants. The largest water utilization outside the power plant is in the enrichment operation. This is the water associated with the generation of the electrical energy for enrichment which is counted twice if the reactor supplies the enrichment electrical energy. Water needs are a strong function of the cooling option that is used in the power plant. Evaporative cooling in wet cooling towers or the use of ponds or rivers for cooling use more water than the wet-dry radiator type of cooling but at the same time the cost varies drastically from location to location. Water required by a single 1,000 megawatt power plant in million gallons per year is 123 for mining, 65 for milling, 26.3 for Uranium production, 11,900 for isotopic enrichment, 5.2 for fuel fabrication, 65,000 to 554,000 for the nuclear power reactor, 10 for fuel processing and 0.26 for waste management. (See also W76-00745) (Robinett-Arizona)
W76-00752

WATER AND ENERGY REQUIREMENTS IN THE MINING AND PROCESSING OF COAL, INCLUDING LAND RECLAMATION,
Peabody Coal Co., St. Louis, Mo.
E. D. Neihaus.
In: Conference on Water Requirements for Lower Colorado River Basin Energy Needs, May 8-9, 1975, p 151-164. 3 fig.

Descriptors: *Water requirements, *Water utilization, *Coal mines, *Water supply, *Arid lands, Strip mines, Coal mine wastes, Water demand, Economics, Costs, Water resources, Water sources, Planning, Efficiencies, Electric power production, *Arizona, Groundwater resources, Land reclamation, Revegetation, Aquifers, *Energy, Water consumption.
Identifiers: Energy requirements, Black Mesa(Ariz), Black Mesa mine, Peabody Coal Company.

The Peabody Coal Company's Black Mesa Mine on the Black Mesa in Northeastern Arizona is discussed. The mined land is graded and revegetated so that it is a good or better grazing land than it was before it was mined. Annual water consumption by the operation is 3,000 to 3,500 acre-feet and it is estimated that the Navajo sandstone, which furnished the water, contains an estimated 10 million acre-feet. In 1974, the mined used 75,000,000 gallons of water and the pipeline to the power plant in Nevada required 1,097,800,000 gallons (298 gallons/ton of coal). Estimations show that the operation will deliver about 100 Btu for every one consumed. (See also W76-00745) (Robinett-Arizona)
W76-00753

ENERGY QUALITY INTERACTIONS OF SUNLIGHT, WATER, FOSSIL FUEL, AND LAND,
Florida Univ., Gainesville, Dept. of Environmental Engineering Sciences.
For primary bibliographic entry see Field 3E.
W76-00754

ENVIRONMENTAL ASPECTS OF SOLAR ENERGY APPLICATIONS,
Arizona Univ., Tucson. Opitical Sciences Center.
For primary bibliographic entry see Field 3E.
W76-00755

ADVANCED PROCESSES: WATER DESALTING AND REUSE,
Arizona Univ., Tucson. Dept. of Civil Engineering and Engineering Mechanics.
For primary bibliographic entry see Field 5D.
W76-00756

POTENTIAL FOR AGRICULTURE UTILIZING WASTE HEAT FROM POWER PLANTS,
Arizona Univ., Tucson. Environmental Research Lab.
For primary bibliographic entry see Field 3C.
W76-00757

WATER CONSUMPTION AND POWER PLANT HEAT REJECTION,
Arizona Univ., Tucson. Dept. of Nuclear Engineering.
For primary bibliographic entry see Field 3E.
W76-00758

THERMAL POWER PLANT SITING IN AN ARID REGION-ENVIRONMENTAL CONSTRAINTS,
Bechtal Power Corp., Los Angeles, Calif.
For primary bibliographic entry see Field 3E.
W76-00759

CITY WASTE WATER REUSE FOR NUCLEAR POWER PLANT COOLING,
Arizona Public Service Corp., Phoenix.
For primary bibliographic entry see Field 5D.
W76-00760

ENVIRONMENTAL COSTS FOR THE NAVAJO GENERATING STATION,
Salt River Project, Phoenix, Ariz.
For primary bibliographic entry see Field 5D.
W76-00761

CUSTOMARY USE OF FLORIDA BEACHES,
For primary bibliographic entry see Field 6E.
W76-00929

THE POTOMAC, 1974 ANNUAL REPORT.
Interstate Commission on the Potomac River Basin, Bethesda, Md.
For primary bibliographic entry see Field 4D.
W76-00935

WATER AND RELATED LAND RESOURCES (AS AMENDED).
Minnesota Sess. Laws, Vol 4, Ch 558, S F No 734, p 1069-1073, approved--effective immediately (1974).

Descriptors: *Minnesota, *Legislation, *Water allocation(Policy), *Priorities, *Comprehensive planning, Future planning(Projected), Preferences(Water rights), Water management(Applied), Appropriation, Water utilization, Water law, Water rights, State governments, Legal aspects, Water conservation, Regulation, Administration, Water policy, Public rights, Water demand, Water resources development, Water resources, Water supply, Priorities, Prior appropriation.
Identifiers: Environmental policy, Administrative regulations, Public trust doctrine.

The Minnesota state commissioner of natural resources, in cooperation with other federal, state and local agencies, is directed to prepare a statewide water and related resources plan to be approved by the legislature. The Commissioner shall establish rules and regulations governing the granting of permits for appropriation and use of public waters, and for changing the course, current, or cross-section of public waters. These regulations shall be consistent with standards herein set forth and the following priorities for appropriation and use of water: domestic water supply; uses involving consumption of less than 10,000 gallons per day; power production, industrial and commercial uses; and other uses involving consumption in excess of 10,000 gallons per day. Appropriation or use of any waters of the state, surface or underground, without written permit of the commissioner is prohibited. This prohibition does not apply to domestic uses serving less than 25 persons. The Commissioner shall impose charges for the excavation of minerals from the beds of public waters. The Commissioner shall also assess the need for particular kinds of lake improvements and shall establish criteria for allocating state aid funds among proposed projects. (Deckert-Florida)
W76-00942

CITY OF DAYTONA BEACH V. TONA-RAMA, INC. (ACTION FOR INJUNCTION TO PREVENT ERECTION OF PUBLIC OBSERVATION TOWER ON BEACH).
For primary bibliographic entry see Field 4C.
W76-00978

6E. Water Law and Institutions

CITIZEN ENFORCERS: INFLUENCING WATER RESOURCES ALLOCATION DECISIONS,
Georgia Inst. of Tech., Atlanta. Inst. of Government.
For primary bibliographic entry see Field 5G.
W76-00505

BIBLIOGRAPHY OF HYDROLOGY, CANADA, 1971-1973.
International Association of Hydrological Sciences, Ottawa (Ontario).
For primary bibliographic entry see Field 10C.
W76-00532

INTERNATIONAL FIELD YEAR FOR THE GREAT LAKES.
National Oceanic and Atmospheric Administration, Rockville, Md.
For primary bibliographic entry see Field 2H.
W76-00535

SALINITY POLICY FOR COLORADO RIVER BASIN,
Colorado State Univ., Fort Collins. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 5G.
W76-00553

SALINITY CONTROL AND FEDERAL WATER QUALITY ACT,
Bureau of Reclamation, Denver, Colo. Water Quality Office.
For primary bibliographic entry see Field 5G.
W76-00617

THE FEDERAL CONSTRUCTION GRANT PROCESS FROM A (BILENE) TO Z (ANESVILLE),
Environmental Protection Agency, Washington, D.C. Office of Water Program Operations.
For primary bibliographic entry see Field 5G.
W76-00629

FINLAND'S CLEANUP CAMPAIGN,
For primary bibliographic entry see Field 5G.
W76-00631

A STRATEGY FOR WATER POLLUTION CONTROL IN BRITAIN,
For primary bibliographic entry see Field 5D.
W76-00638

A CONTINUOUS GARGANTUAN TASK FOR SEVERN TRENT,
Severn Trent Water Authority (England).
For primary bibliographic entry see Field 5A.
W76-00640

EXECUTIVE SUMMARY OF CRITICAL WATER PROBLEMS FACING THE ELEVEN WESTERN STATES.
Bureau of Reclamation, Washington, D.C.
For primary bibliographic entry see Field 6B.
W76-00716

WESTWIDE STUDY REPORT ON CRITICAL WATER PROBLEMS FACING THE ELEVEN WESTERN STATES.
Bureau of Reclamation, Washington, D.C.
For primary bibliographic entry see Field 6B.
W76-00717

WATER FOR ENERGY AS RELATED TO WATER RIGHTS IN THE COLORADO RIVER BASIN,
Arizona Water Commission, Phoenix.
For primary bibliographic entry see Field 6D.
W76-00748

DESIGN CRITERIA--WASTE TREATMENT PLANTS AND TREATMENT OF SEWER OVERFLOW,
Environmental Protection Agency, Springfield, Ill.
For primary bibliographic entry see Field 5D.
W76-00769

AID TO MUNICIPALITIES FOR WATER SUPPLY, POLLUTION ABATEMENT AND SEWER SEPARATIONS.
Vermont Public Acts No 97, 1971. 6 p.

Descriptors: *Legislation, *Water supply, *Pollution abatement, *Separated sewers, Sewage districts, Cities, Cost sharing, *Vermont.

An act, providing for aid to municipalities for water supply, pollution abatement, sewer separation, and engineer planning, first enumerates the procedure required to form a consolidated sewer district and provides that such a body shall be eligible to receive state aid. Requirements for payment and repayment, priorities and limitations, appeal of decisions, and administrative regulations are set forth. The act makes provisions for the method of obtaining grants, priorities to be followed, appeal, and administrative regulations. The act provides for technical and other services to municipalities and details the method of application, form of contacts to be used, eligibility, and limitation. (Sandoski-FIRL)
W76-00789

SPECIAL TIME SCHEDULE FOR THE CITY AND COUNTY OF SAN FRANCISCO RELATIVE TO REGULATION OF DISCHARGES FROM COMBINED SEWERS,
California Regional Water Quality Control Board, Oakland. San Francisco Bay Region.
W. C. Weber.
Resolution No 70-93, amending Resolution No 67-74, California Regional Water Quality Control Board, San Francisco Bay Region, November 24, 1970. 2 p.

Descriptors: *Legislation, Facilities, Sewerage, Wastes, Construction, Sewage, Storm water, Combined sewers, *California.
Identifiers: *San Francisco(Calif).

A resolution which contained a time schedule for the city and county of San Francisco to study and develop a master plan for facilities needed to regulate the quality of wastes discharged from its combined sewerage system was amended for an extension of time for the completion of this study program. Under this sewerage master plan, a detailed time schedule for construction of all facilities necessary for compliance with the Board of Supervisor's requirements related to bypassing of mixtures of sewage and storm water from city sewers was prepared. (Sandoski-FIRL)
W76-00806

SOME FACTORS INFLUENCING GROUNDWATER DEVELOPMENT AND USE FOR AGRICULTURE,
Food and Agricultural Organization, Rome (Italy). Land and Water Development Div.
For primary bibliographic entry see Field 4B.
W76-00813

WATER RESOURCES OF WASHINGTON, A BIENNIAL REPORT TO THE LEGISLATURE, JANUARY 1975.
Washington State Dept. of Ecology, Olympia.
For primary bibliographic entry see Field 6B.

W76-00880+

SOCIAL, LEGAL, AND ECONOMIC CONSIDERATIONS OF ANIMAL PRODUCTION IN URBANIZED AREAS,
For primary bibliographic entry see Field 5D.
W76-00916

NUCLEAR SHIP POLLUTION: NATIONAL AND INTERNATIONAL REGULATION AND LIABILITY,
P. F. Schuster, II.
Environmental Law, Vol 5, No 2, p 203-240, 1975. 180 ref.

Descriptors: *Radioactivity, *Nuclear wastes, *International commissions, *Accidents, *International waters, Navigable waters, United States, Hazards, Adoption of practices, Water pollution, Nuclear reactors, International law, Wastes, Administration, Control, Pollution abatement, Regulation, Environmental effects, Coordination, Irradiation, Harbors, Public health, Discharge(Water), Coolants.
Identifiers: *Nuclear ships, *Absolute liability, Contiguous zone, Coastal waters, Reactor coolant, Safety of Life at Sea Convention (SOLAS), Marine Dumping Convention, Marine Protection Act, Liability, Hazardous substances(Pollution), Environmental Protection Agency.

Worldwide interest in nuclear ship propulsion has grown due to the rising cost of fuel oil. However, concern over the safety hazards presented by nuclear vessels has generated a number of international agreements aimed at (1) preventing radioactive pollution by ships, and (2) providing liability for nuclear accidents. While the likelihood of spillage from an overheated reactor is deemed remote, a major accident at sea would result in harmful radiation exposure for more than a fifty-mile radius. Discharge of reactant coolant water is also potentially harmrful if not strictly regulated. The Marine Dumping Convention, Marine Protection Act, Safety of Life at Sea (SOLAS) Covention, and the Savannah Agreement deal with various aspects of controlling radioactive materials on the high seas. Yet, a major weakness exists becasue of the lack of an independent fact-finding system to insure international compliance with safety standards. The Convention on the Liability of Operators of Nuclear Ships departs from traditional admiralty rules governing collision and liability, announcing seven basic principles regarding nuclear ship liability. The extension of the Price-Anderson Atomic Energy Damages Act to cover nuclear ships is also explored. (Parrish-Florida)
W76-00921

WEATHER MODIFICATION LAW DEVELOPMENTS,
Arizona Univ., Tucson.
For primary bibliographic entry see Field 2B.
W76-00923

UNION OIL CO. V OPPEN: RECOVERY OF A PURELY ECONOMIC LOSS IN NEGLIGENCE (NOTE ON CASE ARISING FROM OIL SPILL).
Iowa Law Review, Vol 60, No 2, p 315-327, 1974. 138 ref.

Descriptors: *Oil pollution, *California, *Economic impact, *Negligence, Legal aspects, Oil spills, Costs, Social impact, Fish, Fishkill, Fishing, Water pollution effects, Pollutants, Water pollution sources, Water quality, Oil industy, Judicial decisions, Penalties(Legal), Federal jurisdiction.
Identifiers: Coastal waters, Hazardous substances(Pollution).

In a recent case, Union Oil Company v. Oppen, the Ninth Circuit applied California tort law to allow commercial fishermen to recoup business losses caused by a negligent oil spill. This decision runs contrary to the generally accepted principle that no recovery is available for economic losses suffered as a result of a defendent's negligence. In arriving at its holding the Ninth Circuit made two essential determinations: (1) The oil company owed a duty to the commercial fishermen to conduct its drilling operations in a reasonable prudent manner to avoid the negligent diminution of the aquatic life; and (2) Any such diminution and damage to fishing could have been anticipated. The court cited the policy considerations against pollution, the need for deterring oil spills, and the economic theory of the optimum apportionment of losses to support its decision. Environmentalists will benefit from the decision because a more pervasive duty of care will be imposed on oil companies engaging in offshore drilling. (Nursey-Florida)
W76-00924

MINERAL DEVELOPMENT AND THE ENVIRONMENT: LEGAL REFORMS FOR THE SITING OF MAJOR FACILITIES,
R. P. Hansen.
Rocky Mountain Mineral Law Institute Annual, Vol 20, p 565-599, 1975. 70 ref, append.

Descriptors: *Federal government, *State governments, *Sites, *Industrial plants, *Legal aspects, Clean Air Act, Planning, Mining, Mining engineering, Colorado, Regional development, Regulation, Environmental control, Environmental engineering, Environmental effects.
Identifiers: Environmental monitoring, Legislation(Proposed), Private sector planning, Environmental impact statements, National Environmental Protection Act.

The conflicts between environmental values and economic developments usually focus on the siting of industrial facilities. Four arguments precede a discussion of governmental and private siting efforts. First, environmental impact statements have little impact upon actual decision-making. Second, the private sector is more likely to produce innovative planning techniques. Third, environmental analysis will become a regular part of mining operations. Finally, initial federal procedures on environmental planning will be augmented by procedures from the private sector and other levels of government. Existing federal legislation encourages environmental planning in addition to requiring disclosure of adverse environmental effects. The Clean Air Act authorizes the states to regulate air pollution from any major industrial facility, including mineral facilities. The main problem with current federal legislation is that each act is only a piecemeal solution of pollution problems. Recent federal legislation is aimed at providing comprehensive land use regulation which also permits states to devise their own methods of planning. Some state legislation regulates industrial-site planning. Progress is being made by several mining companies towards involving the public in planning new sites. Several new organizational tools are needed to integrate planning efforts, such as an environmental data bank and monitoring system. (Jenkins-Florida)
W76-00925

THE BOUNDARY WATERS TREATY OF 1909: DOES IT PROVIDE AN ENVIRONMENTAL CAUSE OF ACTION,
A. T. Carter.
South Dakota Law Review, Vol 20, No 1, p 147-180 (1975). 34 p, 174 ref.

Descriptors: *Treaties, *International law, *Canada, *United States, *Legal agents, Penalties(Legal), Constitutional law, Jurisdiction, Federal jurisdiction, Water law, Governmental interrelations, Internation waters, Foreign waters, Foreign countries, Water pollution, Water quality, Water pollution control, Water pollution sources, Path of pollutants, Water pollution effects.
Identifiers: *Garrison Division Project, *Boundary Waters Treaty of 1909, *Standing(Legal).

The Garrison Division Project is used as a frame of reference to examine, whether the Boundary Waters Treaty of 1909 provides a cause of action Which may be asserted by Canadian citizens in United States courts against the Federal Government for polluting waters crossing the boundary. Treaties are the supreme law of the land pursuant to Article VI of the Constitution and as such, are binding upon the States. Responsibility for giving effect to a treaty rests in part on the judiciary. Whether a particular treaty is entitled to judicial enforcement depends on whether a claim for relief arising under the treaty gives rise to a justiciable controversy. In the case of the Boundary Waters Treaty, justiciability depends on the following factors being shown: (1) the treaty is self-executing; (2) the legislation authorizing the Garrison Division Project does not abrogate the treaty; (3) the treaty grants private rights and remedies; (4) relief is not precluded by failure to exhaust provisions of the treaty; (5) consideration of the treaty is not barred by the political questions doctrine. All five factors are examined and it is concluded that the treaty does provide a cause of action for Canadian citizens in American courts. (Nursey-Florida)
W76-00926

LAKE STREAM CONTRVERSY: A FINAL DECISION,
N. J. Schexnayder.
Loyola Law Review, Vol 21, No 1, p 264-270, 1975. 56 ref.

Descriptors: *Louisana, *Accretion, *Boundaries(Property), Boundary disputes, High water mark, Low water mark, Legal aspects, Water law, Shores, Civil law, Judicial decisions, Legislation, Natural resources, Water rights, Bodies of water, Rivers, Lakes, Streams, Inland waterways.
Identifiers: *Articles 509 and 510 of the Louisiana Civil Code.

The Louisiana law concerning ownership of accretion is dicussed. In interpreting Articles 509 and 510 of the Louisiana Civil Code, the Supreme Court of Louisiana has held the only acknowledged right to the ownership of accretion is that of the accretion formed on rivers and running streams. The legal boundaries of lakes or ponds remain unchanged even though thin physical boundaries may change due to natural processes. The major controversy concerning ownership of land formed by accretion arises in determining whether a body of water is a river or running stream. In the past, the Louisiana courts have held that the ability of a body of water to form accretion is the primary factor to be considered in classifying it. A recent Louisiana Supreme Court case which employs a new test to determine the legal classification of a body of water is discussed. The court turned to a multiple factor test for the classification of a body of water, considering the size, depth, bank, channel and current of the particular body of water, especially as compared to that of streams that enter it. The court also gives heavy consideration to the historical designation of the body of water.(Nursey-Florida)
W76-00927

ENVIRONMENTAL LAW: WEATHER MODIFICATION-PROPOSED FEDERAL LEGISLATION AND THE OKLAHOMA WEATHER MODIFICATION ACT,
R. J. Gore.
Oklahoma Law Review, Vol 28, No 1, p 144-151, 1975. 64 ref.

Descriptors: *Weather modification, *Environmental effects, *Legislation, *Penalties(Legal), *Regulation, Oklahoma, En-

vironmental control, Permits, Droughts, Legal aspects, Research and development, Agroclimatology, Climatology, Cloud physics, Flood control, Meteorology, Weather, Weather data, Control.
Identifiers: Licenses, National Environmental Policy Act, State policy, Administrative regulations.

The issue of state versus federal control of weather modification is discussed. An Oklahoma senator has proposed federal legislation to provide matching funds for the Oklahoma Weather Modification Act and similar state programs. Weather modification techniques have aroused opposition by environmentalists. The Oklahoma Act provides that persons engaging in weather modification activity without a license or permit shall be subject to a misdemeanor citation and a fine. Authority for local governments to raise revenue for weather control projects is included in the Act. The federal bill would authorize the Environmental Protection Agency (EPA) administrator to carry out an emergency drought assistance and prevention program where livestock or crops are threatened. Matching fund grants to encourage states to develop weather control programs would be available. A second bill would establish a National Weather Modification Commission under the EPA. Coordinated research and development combined with the environmental safeguards of National Environmental Policy Act indicate that federal assistance in state weather control projects is desirable. (Jenkins-Florida)
W76-00928

CUSTOMARY USE OF FLORIDA BEACHES,
P. Ireland.
University of Miami Law Review, Vol 29, No 1, p 149-153, 1974. 5 p, 27 ref.

Descriptors: *Florida, *Judicial decisions, *Public rights, *Prescriptive rights, *Local governments, Beaches, Legal aspects, Zoning, State governments, Recreation facilities, Public benefits, Public lands, Land tenure, Recreation.
Identifiers: Declaratory judgement, Custom(Doctrine), Injunctive relief, Property law.

Plaintiff, owner of an observation tower, sought a declaratory judgement against defendant, municipality and construction company, which had been issued a permit to build a tower. Ownership of the land underneath the proposed building was in controversy. Plaintiff claimed that the public had acquired a prescriptive right to use the land. Florida courts have required clear proof of adversity to establish a public right by prescription. A presumption that public use is permissive must be overcome to prove adverse use. In the instant case, the Supreme Court ruled that plaintiff had not established a public easement by prescription because defendant owned an adjacent pier and therefore sought the presence of the public. Summary judgement in favor of plaintiff was vacated and the case remanded to determine whether a public right was established by custom. Where public use of a private beach is reasonable and has continued for many years without dispute or interruption, a public right evolves from custom. A land owner may not then use the land in a manner inconsistent with the public right. The decision represented the first time that the Florida Supreme Court utilized the doctrine of custom to establish public rights in private property. (Jenkins-Florida)
W76-00929

NO DUMPING IN THIS OCEAN: NEARING THE END OF SHIP-GENERATED POLLUTION,
For primary bibliographic entry see Field 5B.
W76-00930

PROPERTY--CLASSIFYING BODIES OF WATER AS LAKES OR STREAMS,
For primary bibliographic entry see Field 2E.
W76-00931

THE THIRD UNITED NATIONS CONFERENCE OF THE LAW OF THE SEA: THE 1974 CARACAS SESSION,
J. R. Stevenson, and B. H. Oxman.
American Journal of International Law, Vol 69, No 1, p 1-30, 1975. 60 ref.

Descriptors: *United Nations, *Treaties, *Law of the sea, *International law, Negotiations, Legal aspects, Water rights, Governments, International waters, Water law, Governmental interrelations, Navigation, Fishing, Resources, Organizations, Foreign countries, Foreign waters, Oceans.
Identifiers: *The Third United Nations Conference on the Law of the Sea, Coastal waters, Contiguous zone.

The accomplishments and failures of the 1974 Session of the Third United Nations Conference on the Law of the Sea are described. The object of the Law of the Sea Conference is a comprehensive Law of the Sea Treaty. While this was not achieved, the 1974 Session accomplished a great deal and the foundation has been laid for a workable treaty. The most important accomplishments of the session are as follows: (1) an agreement was reached on the Rules of Procedure and the Conference adopted a 1975 work schedule deliberately devised to stimulate agreement; (2) the inclusion in the treaty of a 12-mile territorial sea and a 200-mile economic zone was all but formally agreed upon; (3) the first steps have been taken toward real negotiation of the basic questions of the system and conditions of exploitation of deep seabeds; (4) traditional regional and political alignments of states are being replaced by informed groups whose membership is based on similarities of interest on a particular issue. Considerable progress has been made in all important areas and if the states now negotiate on the hard issues, there can be a widely acceptable Law of the Sea Treaty in 1975. (Nursey-Florida)
W76-00932

SYSTEM FOR EXPLOITATION OF THE 'COMMON HERITAGE OF MANKIND' AT THE CARACAS CONFERENCE,
Ministry of Foreign Affairs, Nairobi (Kenya). Legal Div.
For primary bibliographic entry see Field 6A.
W76-00933

TERRITORIAL SOVEREIGNTY AND THE PROBLEM OF TRANSNATIONAL POLLUTION,
G. Handl.
American Journal of International Law, Vol 69, No 1, p 50-76, 1975. 162 ref.

Descriptors: *International law, *Water pollution effects, *Legal aspects, *Penalties(Legal), *Australia, Pollutants, Water pollution sources, Path of pollutants, Pollutant identification, Water pollution control, Radioactivity, Radioactivity, effects, Nuclear explosions, Governmental interrelations, Foreign countries, Governments, Foreign waters, International waters.
Identifiers: *Territorial sovereignty, International Court of Justice(ICJ), Standing(Legal).

In a case concerning the legality of French atmospheric nuclear testing in the South Pacific currently before the International Court of Justice (ICJ), Australia has raised the issue that the deposits of radioactive fallout on the territory of Australia without Australia's consent violates Australian sovereignty over its territory. In the context of the aforementioned case, the legal rules applicable to situations involving activities which although lawful nonetheless produce environmental effects in territory of another state are discussed. After an examination of the pertinent case law and writings in the area, the following conclusions are made: (1) International law requires proof of material damage as a condition precedent to establishment of legal responsiblity on the part of the polluting state; therefore, the state affected by transnational pollution cannot prevail with a claim based merely on a violation of its sovereignty; (2) Material damage must be established as the direct consequence of an actual transfrontier crossing of pollutants before a cause of action by the affected state against the polluting state would arise. (Nursey-Florida)
W76-00934

THE POTOMAC, 1974 ANNUAL REPORT.
Interstate Commission on the Potomac River Basin, Bethesda, Md.
For primary bibliographic entry see Field 4D.
W76-00935

DEPARTMENT OF NATURAL RESOURCES V MAYOR AND COUNCIL OF OCEAN CITY (ACTION BY OWNER OF LAND TO REAR OF OCEAN FRONT TRACT TO ENJOIN CONSTRUCTION OF CONDOMINIUM).
For primary bibliographic entry see Field 6G.
W76-00936

AMENDING THE WILD AND SCENIC RIVERS ACT OF 1968 BY DESIGNATING A SEGMENT OF THE NEW RIVER AS A POTENTIAL COMPONENT OF THE NATIONAL WILD AND SCENIC RIVERS SYSTEM.
For primary bibliographic entry see Field 6G.
W76-00937

UNITED STATES V GAF CORPORATION (ACTION FOR INJUNCTIVE RELIEF FROM DISPOSAL OF ORGANIC WASTES BY DEEP WELL INJECTION).
For primary bibliographic entry see Field 5B.
W76-00938

SAVE OUR SOUND FISHERIES V CALLAWAY (ACTION TO ENJOIN DUMPING DREDGED SPOIL INTO NAVIGABLE OCEAN WATERS).
For primary bibliographic entry see Field 5C.
W76-00939

WATER AND RELATED LAND RESOURCES (AS AMENDED).
For primary bibliographic entry see Field 6D.
W76-00942

PERMITS FOR ACTIVITIES IN NAVIGABLE WATERS OR OCEAN WATERS.
For primary bibliographic entry see Field 8A.
W76-00945

CARCINOGENS COMPLICATE CHLORINE QUESTION,
For primary bibliographic entry see Field 5B.
W76-00946

CHEMEHUEVI TRIBE OF INDIANS V FEDERAL POWER COMMISION (ACTION TO DETERMINE JURISDICTION OF FPC OVER THERMAL ELECTRIC POWER PLANTS LOCATED ON NAVIGABLE STREAMS).
95 S Ct 1066-1082 (1975), 17p.

Descriptors: *Jurdicial decisions, *Thermal powerplants, *Hydroelectric power, *Federal Power Act, *Jurisdiction, Colorado River, Navigable waters, Permits, Indian reservations, Federal government, Federal jurisdiction, Thermal power, Thermal water, Navigable rivers, Electric power, Electric power industry, Electric power plants.
Identifiers: Licenses, Dam effects, Indian tribes, Indian water rights.

Plaintiffs, Indian tribes and environmental groups, requested defendant, Federal Power Commission

(FPC), to require defendant public utility companies to obtain licenses for thermal-electric generating plants under construction along the Colorado River. The complaint was dismissed by the FPC on the grounds that thermal-electric plants are not 'project works' under Section 4e of the Federal Water Power Act of 1920. The Court of Appeals for the District of Columbia affirmed the agency's order to dismiss for lack of jurisdiction. Plaintiffs asserted that a literal reading of the statute showed that thermal-electric power plants drawing water from navigable streams are under FPC jurisdiction. The Supreme Court approved the Circuit court's holding that the scope of the Act does not extend to steam power. The FPC has consistently maintained that its licensing authority extends only to hydroelectric projects. The Court disagreed with lower court's opinion that the 'surplus water' clause of Section 4e afforded the FPC a broader authority over federally controlled waters. The FPC has never licensed thermal-electric power plants using surplus water from Government dams. (Jenkins-Florida)
W76-00947

U.S. V. WHITE FUEL CORP. (APPEAL FROM CONVICTION OF VIOLATION OF REFUSE ACT).
For primary bibliographic entry see Field 5B.
W76-00948

PEOPLE OF STATE OF NEW YORK V. WECHALER (APPEAL FROM CONVICTION FOR VIOLATION OF ORDINANCE REGULATING WATER SKIING WITHIN A HARBOR).
359 N.Y.S.2d 939 (S Ct 1974).

Descriptors: *Water skiing, *Recreation, *Jurisdiction, *Surface waters, *Harbors, Recreation facilities.
Identifiers: *Municipal ordinance, *Police power, Courts.

Defendents were convicted of violating a municipal ordinance regulating water skiing within the town's harbor. On appeal, the defendants contended that the jurisdiction conferred on the Commissioner of Conservation by state law preempted municipal regulation. The New York Supreme Court held that in absence of specific state legislation governing the conduct of water-skiing on tide waters lying within county boundaries, local governments may properly enact ordinances to regulate this activity. (Denvir-Florida)
W76-00949

ATLAS CHEMICAL INDUSTRIES, INC. V. ANDERSON (ACTION FOR DAMAGES FROM DISCHARGE OF POLLUTANTS INTO CREEK CROSSING PLAINTIFF'S LANDS).
514 S.W.2d 309 (Texas App. 1970).

Descriptors: *Land tenure, *Industrial wastes, *Permits, *Carbon, *Chemical industry, Judicial decisions, Water law, Legal review, Streams, Texas, Water pollution, Waste water disposal, Damages, Water quality, Federal jurisdiction, Environmental effects, Water pollution sources.
Identifiers: *Fair market value, *Punitive damages.

Suit was brought by a landowner against a carbon processing plant which discharged industrial waste into a creek which crossed the plaintiff's land. The district court held for the landowner. The Texas Court of Civil Appeals for the sixth circuit affirmed holding that in cases of intentional continuing pollution each day's pollution is a new offense. The fact that the defendant had been granted a permit to discharge pollutants into a stream was not a defense to an action for pollution damages. The correct measure of damages where the diminuation of fair market value is less than the cost of restoration is the diminution of fair market value. The court also held that by intentional violation of its permit the defendent was responsible for malicious and wanton disregard of rights and safety of others justifying an award of punitive damages. (Sperling-Florida)
W76-00950

STATE OF OHIO EX REL. BROWN V. CALLAWAY (ACTION BY STATE TO ENJOIN CONSTRUCTION OF TWO RESEARVOIRS).
497 F.2d 1235 (6th Cir June 6, 1974).

Descriptors: *Ohio, *Federal Water Pollution Control Act, *Construction, *Legal aspects, *Judicial decisions, Reservoirs, Legislation, Recreation, State governments, Social aspects, Aesthetics, Water law.
Identifiers: *Economic aspects, *Injunctive relief, *Standing, *Environmental impact statement.

An action was brought by the State of Ohio seeking to enjoin the Army Corps of Engineers from constructing two reservoirs. The district court entered an injunction, permitting limited construction despite the fact that the Army Corps of Engineers had failed to file an adequate environmental impact statement. The court also refused to allow certain conservation groups, property owners, and a contractors' association to intervene in the action. The Court of Appeals held the determination that the Army Corps of Engineers had failed to file an adequate environmental impact statement did not require an injunction against all activities. The district court may tailor the relief granted to the particular circumstances of the case. The appellate court also held that the applicants for intervention had an unconditional right to intervene under the Federal Water Pollution Control Act. (Sperling-Florida)
W76-00951

STATE OF WISCONSIN V. MICHELS PIPELINE CONSTRUCTION, INC. (ACTION FOR AN ORDER TO CONSTRUCT SEWER SO AS NOT TO CREATE A NUISANCE TO NEIGHBORING LANDOWNERS).
For primary bibliographic entry see Field 5D.
W76-00952

TEMPLETON V. HUSS (ACTION FOR INJUNCTIVE RELIEF FOR INCREASED SURFACE WATER RUNOFF).
For primary bibliographic entry see Field 4B.
W76-00953

CITY OF WAUKENGAN V. POLLUTION CONTROL BOARD (APPEAL FROM PROCEEDING ASSESSING FINES AGAINST CITIES AND CORPORATION).
For primary bibliographic entry see Field 5B.
W76-00954

TOWN OF ISLIP V. POWELL (ACTION TO ENJOIN RENTING DOCK FACILITIES).
358 N.Y.2d 985 (Sup Ct Suffolk County 1974).

Descriptors: *New York, *Riparian rights, *Zoning, *Marinas, *Docks, Judicial decisions, Legal aspects, Planning, Local governments, Coastal structures, Navigable waters, Riparian land, Land use, Beds, Construction.
Identifiers: *Ordinances, *Submerged lands.

Plaintiff brought suit to enjoin marina operators from renting docking facilities on a portion of their marina, which extended from their adjacent residentially-zoned property. The court held that tidewaters are exempt from the State's jurisdiction over navigation, entitling the town to enforce its ordinance through injunctive relief. The court found that use of commercial docks in front of residentially-zoned property could not be seen as an extension of raparian rights, and not deserving of exemption from zoning restrictions. The town ordinance provided that underwater land shall be considered within the same zoning district as the abutting land for a distance of one hundred feet. Riparian owners have the right of access to navigable waters including the right to construct a dock. Those rights, however, are an extension of the rights of abutting land ownership and subject to the same limitations. (Sperling-Florida)
W76-00955

CITIZEN SUITS SPUR COURT PROBES OF ENVIRONMENTAL IMPACT.
Electrical World, Vol 177, p 28, May 1, 1972.

Descriptors: *Legal aspects, *Environmental effects, *Decision making, *Federal government, Administrative agencies, Adoption of practices, Project planning, Legislation, Judicial decisions, Legal review, Regulation, Administration, Law enforcement, Governments, Governmental interrelations.
Identifiers: *National Environmental Policy Act, Environmental impact statement, Private interests groups, Private enforcement.

The National Environmental Policy Act of 1969 requirement of environmental impact statement is court enforceable at the suit of interested citizens. The general counsel to the Council on Environmental Quality believes that citizen suits will lead to a rigorous probing of the environmental impact of government action. The Council views environmental laws as carrying with them a broad concept of standing to sue. In practice federal agencies submit statements on any project having some effect on the environment. Some officials have termed the process a procedural nightmare requiring vast amounts of paper and analysis. Another difficulty for agencies is when a unrealistic explanation of consequences and alternatives is required. A disputed issue is the extent to which courts should be relied upon to balance conflicting values. The prevalent seems to be that the function of weighting competing interests was placed in the hands of the agencies by Congress, and there it should remain. The main failing of the act so far has been the agencies' refusal to recognize its responsibility to consider environmental values at every stage leading to wasteful court review. (Sperling-Florida)
W76-00956

LEGAL MEASURES CONCERNING MARINE POLLUTION.
North Carolina State Univ., Raleigh.
Sea Grant Publication UNC-SG-75-04, February 1975. 83 p, 463 ref.

Descriptors: *North Carolina, *International law, *Water pollution, *Island, Oil, Grants, Projects, Water pollution effects, Research and development, Oil pollution, Water pollution control, Water pollution sources, Water quality control, Waste disposal, Legal aspects, International waters, Water law, Environmental effects, Law enforcement, Water resources development, Mineral industry, Waste dumps.
Identifiers: *Sea Grant projects.

This compilation of papers is a chronicle of new concepts and developments in marine pollution control. The articles presented were researched and written by students of International Laws at the University of North Carolina during the fall 1974 semester. One article discusses the use of the oceans as international disposal sites for industrial chemical waste materials. Another paper covers man-made islands and the relevant environmental objections to such structures, as well as legislation aimed at curbing pollution. Further, the use of man-made islands is considered in terms of feasibily for use in mineral extraction from the sea. In additionm probable cause requirements of the Fourth Amendment are explored in relation to vessel searches at sea. A new approach to pollution control on an international level is proposed.

Finally, controversies in pollution control created as a consequence of the trans-Alaskan pipeline are delineated. (See W76-00964 thru W76-00969) (Hoffman-Florida)
W76-00963

POLLUTION OF THE HIGH SEAS: THE OCEANS AS INTERNATIONAL RIVERS,
North Carolina State Univ., Raleigh.
C. C. Stretch.
In: Legal Measures ConcerningMarine Pollution, Sea Grant Publication UNC-SG-75-04, p 1-11, February 1975. 62 ref.

Descriptors: *International law, *Jurisdiction, *Water pollution control, *Waste disposal, Legal aspects, Water pollution effects, Coasts, Ecosystems, Law of the sea, Riparian waters, Technology, International waters, Treaties, Penalties(Legal), Water law, Water rights, Riparian rights, Oceans, Judicial decisions.
Identifiers: *Co-riparians, Coastal watsers, Hazardous substances(Pollution), International agreements.

The development of man's legal systems eemingly lags behind the advance of technology. This is exemplified by an international legal system which grants general license to exploit the seas with a technology that threatens to destroy the marine environment. Contemporary needs call for a shift from traditional concepts of sovereignty and freedom of the seas to a concept more protective of the marine ecosystem and coastal resources. One commentator suggests that the oceans be viewed as international rivers with all states sharing the rights and liabilities of co-riparians. The suggestion is based on the proposition that the seas are the common and co-equal territory of every state. Asserting claims against co-riparians for unreasonable use of the international rivers would be made possible through this special territoriality. Three cases dealing with the international application of this proposition are analyzed, and a definition of actionable pollution activity under this theory is proposed. Criteria for defining the injury, for determining possession of the protected interests, and for establishing objective standards are presented. Possible defenses to such actions are also explored. (See also W76-00463) (Hoffman-Florida)
W76-00964

ARTIFICIAL ISLANDS: POSSIBILITIES AND LEGAL PROBLEMS,
North Carolina State Univ., Raleigh.
D. LeFebvre.
In: Legal Measures Concerning Marine Pollution, Sea Grant Publication UNC-SG-75-04 p 12-24, February 1975. 109 ref.

Descriptors: *Islands, *Floats, *Environmental effects, Natural resources, Water resources, Deep water, Economic feasibility, Oceans, Jurisdiction, Legal aspects, Aquatic habitats, International waters, Water rights, Law of the sea, Aquatic life, Water law, Water resources development, Mineral industry, Offshore platforms, Islands, Land use, Population.
Identifiers: *Artificial islands, *Deepwater ports.

With the realization that valuable mineral resources could be extracted profitably from the sea, part of the ocean's mystery disappeared. It became apparent that man-made islands offered great potential for mineral extraction. A brief history of two aborted attempts to form the islands of 'Taluga' and 'Abalonia' off the west coast near San Diego is presented. The purpose of these attempts was to form a base outside the territorial jurisdiction of the United States from which to harvest abundant supplies of lobsters and abalone. Some commentators opine that the law of the sea will have to answer the problem of dwindling land space, and permit some traditionally land based activities to be transferred to artificial islands. One marine science authority supports the view that offshore platforms are an economically feasible solution to population density and diminishing land space. Other proposed non-extractive uses of artificial islands include floating airports, floating oil storage tanks, and deepwater ports to accomodate supertankers. Jurisdictional problems which might arise regarding artificial islands are explored. (See also W76-00963) (Hoffman-Florida)
W76-00965

MARINE POLLUTION CONTROL AND MAN-MADE ISLANDS,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6G.
W76-00966

FOURTH AMENDMENT PROBLEMS IN THE ENFORCEMENT OF MARINE CONSERVATION LAWS,
North Carolina State Univ., Raleigh.
P. Stam, Jr.
In: Legal Measures Concerning Marine Pollution, Sea Grant Publication UNC-SC-75-04, p 45-55, February 1975. 53 ref.

Descriptors: *Law enforcement, *Penalties(Legal), *Federal jurisdiction, *Constitutional law, Regulation, Water law, Water policy, Water quality control, Legal aspects, Political aspects, International law, Jurisdiction, Law of the sea, Federal government, Governments, Political constraints, Ships, Water pollution sources, Boats, Environmental effects.
Identifiers: *Vessels, Searches, Probable cause, Hazardous substances(Pollution), Fourth amendment.

The effectiveness of anti-pollution and fishery conservation laws depends in part on the enforcement methods used. The application of the probable cause requirement of the Fourth Amendment to search of vessels at sea is explored. Generally, a warrant based on probable cause is required to search for evidence of a crime; but there are exceptions. It is suggested that a search of vessels at sea may fall within the logic of these exceptions. One exception provides that any person crossing an international border into the United States may be required to submit to a search, regardless of whether probable cause exists. The rationale for a border search is that one who crosses the border expects to be searched and explicitly consents to it. Similarly, it is arguable that a vessel search at sea is the functional equivalent of a border search. Further, a vessel search is compared to two other common exceptions to probable cause searches: administrative searches, and searches of a business affecting the public interest. Additionally, the international problems associated with searching foreign vessels are also explored. (See also W76-00963) (Hoffman-Florida)
W76-00967

INTERNATIONAL OCEAN DUMPING OF INDUSTRIAL CHEMICAL WASTE,
North Carolina State Univ., Raleigh.
P. B. Stam, Sr.
In: Legal Measures Concerning Marine Pollution, Sea Grant Publication UNC-SG-75-04, p 56-71, February 1975. 92 ref.

Descriptors: *Federal Water Pollution Control Act, *Waste dumps, *Industrial wastes, *Chemical wastes, *Waste disposal, Pesticide residues, Legislation, Federal jurisdiction, Aquatic habitats, Organic pesticides, Organic wastes, Water quality control, Water law, Penalties(Legal), Pesticide removal, Standards, Waste treatment, Waste water(Pollution), Wastes, Waste water treatment, Pesticides, Regulation.
Identifiers: Ocean Dumping Act, Marine environment, Administrative regulations, Effluent limitations, Hazardous substances(Pollution), Federal Water Pollution Control Act Amendments of 1972.

The use of the oceans for disposal of industrial chemical waste materials on an international level is discussed. Legislation passed by the United States Congress in 1972 regulates the disposal of wastes into the marine environment. Ultimate goals include complete control over and limitation of the disposal of harmful materials into the oceans. Title I of the Ocean Dumping Act is designed to regulate dumping both within and beyond the territorial jurisdiction of the United States. Civil and criminal provisions are provided for violators. The objective of the Federal Water Pollution Control Act Amendments of 1972 is to eliminate the discharge of pollutants into navigable waters by 1985. The details of both the above acts are explored. Environmental Protection Agency criteria for granting open water dumping permits and related problems are explored. Finally, a new method for disposing of persistent pesticides is analyzed. This technique involves high temperature incineration of chlorinated organic wastes, conducted at sea in ships specially equipped to carry out the combustion. (See also W76-00963) (Hoffman-Florida)
W76-00968

THE QUEST FOR OIL: A DECISIVE FORCE IN THE LAW OF THE ARCTIC SEA PERTAINING TO POLLUTION,
North Carolina State Univ., Raleigh.
J. C. Wyatt.
In: Legal Measures Concerning Marine Pollution, Sea Grant Publication, UNC-SG-75-04, p 72-80, February 1975. 68 ref.

Descriptors: *Alaska, *Canada, *Oil pollution, *Water pollution control, Water pollution effects, Oil industry, Oil fields, International law, Legal aspects, Jurisdiction, Oil spills, Oil wastes, Oil reservoirs, Legislation, International waters, Pipelines, Water pollution sources, Water pollution, Water pollution treatment, Water quality, Water Quality Act, Water quality control.
Identifiers: *Arctic waters, *Alaska Oil Pipeline, *Territorial jurisdiction, Hazardous substances(Pollution), International agreements, Oil Pollution Act.

Discovery of the oil reserves of the North Slope of Alaska triggered the current interest and controversy regarding oil pollution control in the Arctic. After years of litigation and despite the ecological threats posed to the permafrost layer and local wildlife, construction of the Trans-Alaska Pipeline began in early 1974. As a result of the pipeline increasing attention has been focused on the arctic waters. The efforts of the Canadian government to prevent future pollution culminated in the Canadian Arctic Waters Pollution Prevention Act as a comprehensive attempt to meet the threat of all types of water pollution in the Arctic. Problems concerning international jurisdiction of the Arctic waters are highlighted. Existing international law does not provide specific principles governing ocean pollution. The present and future controversies concerning territorial jurisdiction of the Arctic waters demonstrate the need for an international policy concerning ocean pollution (See also W76-00963) (Hoffman-Florida)
W76-00969

WATER RIGHTS,
Davis, Graham and Stubbs, Denver, Colo.
W. A. Hillhouse, II.
Annual Survey of American Law, Vol 1973-74, p 255-264, Winter 1974. 73 ref.

Descriptors: *Groundwater resources, *Surface-groundwater relationships, *Federal-state water rights conflicts, *Rivers and Harbors Act, *Well regulations, Federal jurisdiction, State jurisdiction, Judicial decisions, Water law, Regional development, Monitoring, Control, Administrative agencies, Prescriptive rights, Reasonable use, Appropriation.

Identifiers: *Groundwater rights, *Water Resources Council, *Implied reservation, Vested rights, Reserved use.

Since 1961, there have been major developments in water law regarding federal-state relations, groundwater use and regulation, and environmental restrictions on federal water projects. The Californai Supreme Court applied the doctrine of implied reservation in holding that the federal government has water rights where land under its jurisdiction requires outside water sources. The problem of adjucicating federal rights in state courts has been eased by a 1971 Supreme Court decision which held that the federal government may be joined as a defendant to determine reserved as well as appropriated water rights. Section III of the Rivers and Harbors Act of 1970 alleviates the no-compensation of navigational servitudes judicial doctrine by providing that a landowner should be compensated for the highest and best use of his property, including the value of such navigable waters. Litigation concerning the rights of groundwater users inter se has attempted to mitigate the common law rule that the overlying land-owner has exclusive rights to subsurface water with a reasonable use rule. Colorado has enacted several statutes dealing with groundwater rights. One requires a permit before appropriating water from a designated groundwater basin. When pumping or installation of wells poses a threat to appropriate from related surface waters, its use will be regulated. Several water conservation acts enacted in the 1960's have been applied by courts to require studies of adverse effects of water control projects, and regulations issued by the Water Resources Council in 1973 should have a substantial effect on state and local planning in this area. (Jenkins-Florida)
W76-00974

FLUORIDE POLLUTION,
National Research Council, Washington, D. C.
For primary bibliographic entry see Field 5C.
W76-00975

PIERCE V. RILEY (ACTION BY RIPARIAN OWNERS FOR INJUNCTION TO PROVIDE ACCESS TO LAKE).
For primary bibliographic entry see Field 4A.
W76-00976

OMERNIK V. STATE OF WISCONSIN (APPEAL FROM CONVICTION FOR DIVERSION OF WATERS FROM LAKES AND STREAMS WITHOUT A PERMIT).
For primary bibliographic entry see Field 4A.
W76-00977

CITY OF DAYTONA BEACH V. TONA-RAMA, INC. (ACTION FOR INJUNCTION TO PREVENT ERECTION OF PUBLIC OBSERVATION TOWER ON BEACH).
For primary bibliographic entry see Field 4C.
W76-00978

CHIPOLA NURSERIES, INC. V. DIVISION OF ADMINISTRATION, DEPARTMENT OF TRANSPORTATION (APPEAL OF EMINENT DOMAIN PROCEEDING FOR VIOLATION OF NEPA).
For primary bibliographic entry see Field 6A.
W76-00979

RIVER DEFENSE COMMITTEE V. THIERMAN (ACTION UNDER NEPA TO COMPEL A PUBLIC HEARING BEFORE ISSUING PERMIT).
380 F. Supp. 91 (S. D. New York 1974).

Descriptors: *Judicial decisions, *New York, *Permits, *Administration, *Adoption of practices, Legal review, Regulation, Construction, Shoreline, Federal jurisdiction, Land reclamation, United States, Planning, Administrative agencies, Decision making, Water policy, Bulkheads.
Identifiers: *National Environmental Policy Act, *Injunctive relief, *Land ownership, *Statues.

An action was brought under the National Environmental Policy Act against the District Engineer of the United States Corps of Engineers. The Southern District Court of New York held that a hearing was necessary before issuing a permit for construction of a bulkhead and the placement of landfill shoreward for the purpose of building a family dwelling. The court also held that federal agencies must establish reviewable environmental records. The jurisdiction of a federal court under the National Environmental Policy Act extends only to review of compliance with congressional dictates and the agency's own regulations. Policy determinations are left to the expertise of the agency. (Sperling-Florida)
W76-00980

BOONE V. TILLATOBA CREEK DRAINAGE DISTRICT (SUIT SEEKING INJUNCTIVE RELIEF WITH RESPECT TO PROPOSED DRAINAGE PROJECT).
379 F. Supp 1239 (N D Miss 1974).

Descriptors: *Mississippi, *Federal jurisdiction, *Judicial decisions, *Drainage districts, Project planning, Drainage program, Drainage systems, Water policy, Administration, Water management(Applied), Standards, Legal review, Administrative agencies, Decision making, Adoption of practices.
Identifiers: *Injunctive relief, *National Environmental Policy Act, *Burden of proof, *Environmental impact statement, *Tallahatchie and Yalobusha Counties(Miss).

An action was brought in the United States District Court for northern Mississippi seeking to enjoin a proposed drainage project. The court held that in determining the sufficiency of the environmental impact statement and further compliance with the National Environmental Policy Act, the burden of proof is on the plaintiffs to prove by a preponderance of the evidence that the defendents failed to adhere to the requirements. The National Environmental Policy Act sets standards of limited review of substantive ecological decisions made by federal agencies under the Administrative Procedure Act. In light of substantial reasons for proceeding with the drainage district project, the court could not substitute its judgement for that of federal authorities legally authorized to design and implement the project. No evidence was offered to show that the federal agency acted arbitrarily or irrationally in recommending the project. (Sperling-Florida)
W76-00981

GARDINIER, INC. V. FLA. DEPT. OF POLLUTION CONTROL (PETITION FOR WRIT OF CERTIORARI TO DETERMINE THE VALIDITY OF AN ORDER OF THE DEPARTMENT OF POLLUTION CONTROL).
For primary bibliographic entry see Field 5B.
W76-00982

MARINE TOWING, INC. V. RED STAR TOWING AND TRANSPORTATION CO. (ACTION FOR DAMAGES SUFFERED WHEN TUG STRUCK A WRECK IN NAVIGABLE WATERS).
381 F Supp 619 (E D New York 1973).

Descriptors: *New York, *Judicial decisions, *Boating regulations, Legal aspects, Boats, Harbors, Negligence, Remedies, Damages, State jurisdiction, Safety, Water law, Hazards, Accidents.
Identifiers: *Statutes.

An admiralty action was brought in federal District Court by a tugboat owner for damages suffered when it struck a wreck. The court held the Coast Guard's placing of a flag and lantern on the mast and direction of ships around the wreck did not relieve the wreckowner of its duties under the Wreck Statute. The owner was held in violation of the statute for failing to keep watch until the Coast Guard had marked the wreck with a more permanent buoy. In addition, the court found that where both the tugboat owner and the owner of the wreck were negligent each was liable for half of the damage. (Sperling-Florida)
W76-00983

LEGAL ASPECTS OF PHOSPHATE MINING IN NORTH CAROLINA,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6G.
W76-00984

TANKERS AND THE MARINE ENVIRONMENT, PART I.
For primary bibliographic entry see Field 5B.
W76-00985

DISAPPROVAL OF THE DEFERRAL OF WATER POLLUTION CONSTRUCTION GRANT FUNDS.
For primary bibliographic entry see Field 6C.
W76-00986

HUMAN ECOLOGY. PROBLEMS AND SOLUTIONS,
For primary bibliographic entry see Field 5C.
W76-00987

TRANSACTIONS OF THE THIRTY-EIGHTH NORTH AMERICAN WILDLIFE AND NATURAL RESOURCES CONFERENCE, WASHINGTON, D.C., MARCH 18-21, 1973.
For primary bibliographic entry see Field 6G.
W76-00997

6F. Nonstructural Alternatives

FLOOD-HAZARD STUDY--100-YEAR FLOOD STAGE FOR APPLE VALLEY DRY LAKE, SAN BERNARDINO COUNTY, CALIFORNAI,
Geological Survey, Menlo Park, Calif.
For primary bibliographic entry see Field 4A.
W76-00659

A LAND USE DECISION METHODOLOGY FOR ENVIRONMENTAL CONTROL,
Rocky Mountain Center on Environment, Denver, Colo.
For primary bibliographic entry see Field 6B.
W76-00683

WEATHER MODIFICATION LAW DEVELOPMENTS,
Arizona Univ., Tucson.
For primary bibliographic entry see Field 2B.
W76-00923

MINERAL DEVELOPMENT AND THE ENVIRONMENT: LEGAL REFORMS FOR THE SITING OF MAJOR FACILITIES,
For primary bibliographic entry see Field 6E.
W76-00925

ENVIRONMENTAL LAW: WEATHER MODIFICATION-PROPOSED FEDERAL LEGISLATION AND THE OKLAHOMA WEATHER MODIFICATION ACT,
For primary bibliographic entry see Field 6E.
W76-00928

CUSTOMARY USE OF FLORIDA BEACHES,
For primary bibliographic entry see Field 6E.
W76-00929

UNITED STATES V GAF CORPORATION (ACTION FOR INJUNCTIVE RELIEF FROM DISPOSAL OF ORGANIC WASTES BY DEEP WELL INJECTION).
For primary bibliographic entry see Field 5B.
W76-00938

CHEMEHUEVI TRIBE OF INDIANS V FEDERAL POWER COMMISION (ACTION TO DETERMINE JURISDICTION OF FPC OVER THERMAL ELECTRIC POWER PLANTS LOCATED ON NAVIGABLE STREAMS).
For primary bibliographic entry see Field 6E.
W76-00947

HAYS, KANSAS, FLOOD PROTECTION PROJECT (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Kansas City, Mo.
For primary bibliographic entry see Field 8A.
W76-00973

WATER RIGHTS,
Davis, Graham and Stubbs, Denver, Colo.
For primary bibliographic entry see Field 6E.
W76-00974

6G. Ecologic Impact Of Water Development

CITIZEN ENFORCERS: INFLUENCING WATER RESOURCES ALLOCATION DECISIONS,
Georgia Inst. of Tech., Atlanta. Inst. of Government.
For primary bibliographic entry see Field 5G.
W76-00505

VALLEY FORGE AREA WASTEWATER TREATMENT FACILITY, CHESTER COUNTY, PENNSYLVANIA, FINAL ENVIRONMENTAL IMPACT STATMENT.
Environmental Protection Agency, Philadelphia, Pa. Region III.
For primary bibliographic entry see Field 5D.
W76-00508

INTERCEPTOR SEWERS AND SUBURBAN SPRAWL: THE IMPACT OF CONSTRUCTION GRANTS ON RESIDENTIAL LAND USE. VOLUME I, ANALYSIS.
Urban Systems Research and Engineering, Inc., Cambridge, Mass.
For primary bibliographic entry see Field 5D.
W76-00515

MAN'S ACCELERATION OF HYDROGEOCHEMICAL CYCLING OF PHOSPHORUS: EUTROPHICATION OF INLAND AND COASTAL WATERS,
Eidgenoessische Technische Hochschule, Zurich (Switzerland).
For primary bibliographic entry see Field 5C.
W76-00620

ENVIRONMENTAL ASPECTS--SACRAMENTO BANK PROTECTION,
Army Engineer District, Sacramento, Calif. Water Resources Planning Branch.
For primary bibliographic entry see Field 4D.
W76-00621

TROUBLE IN PARADISE,
Clark Univ., Worcester, Mass. Dept. of Environmental Affairs.
For primary bibliographic entry see Field 5G.
W76-00625

PROBLEMS OF SCALE AND DETAIL IN ECOLOGICAL MODELLING,
Utah State Univ., Logan. Ecology Center.
D. W. Goodall.
Journal of Environmental Management, Vol 2, No 2, p 149-157, April 1974. 1 ref.

Descriptors: *Model studies, *Ecosystems, Dynamics, *Ecology.
Identifiers: *Ecosystem models, Niche structure.

The importance of niche structure in ecosystem dynamics is emphasized. This implies that an ecosystem model which ignores species differences runs the rish of neglecting important elements in its dynamics. Unless circumstances permit direct comparison of a simplified model with the observed behavior of a representative range of eco systems, it is recommended that acceptance of the simplified model be based on a demonstration that deviations from the behavior of an alternative model taking biological diversity fully into account are negligible for the purposes in question. Spatial heterogeneity, like biological diversity, may contribute greatly to the dynamics of an ecosystem, and a simplified model which ignores it should be accepted only if justified either by an empirical test or by a comparison with a more complex model taking the heterogeneity into account. (Skogerboe-Colorado State)
W76-00739

ENVIRONMENTAL ASPECTS OF SOLAR ENERGY APPLICATIONS,
Arizona Univ., Tucson. Optical Sciences Center.
For primary bibliographic entry see Field 3E.
W76-00755

THERMAL POWER PLANT SITING IN AN ARID REGION-ENVIRONMENTAL CONSTRAINTS,
Bechtal Power Corp., Los Angeles, Calif.
For primary bibliographic entry see Field 3E.
W76-00759

ENVIRONMENTAL COSTS FOR THE NAVAJO GENERATING STATION,
Salt River Project, Phoenix, Ariz.
For primary bibliographic entry see Field 5D.
W76-00761

NUCLEAR SHIP POLLUTION: NATIONAL AND INTERNATIONAL REGULATION AND LIABILITY,
For primary bibliographic entry see Field 6E.
W76-00921

OCEAN SPACE FOR MANKIND: INTERNATIONAL LAW OF THE SEA,
Royal Univ. of Malta, Msida.
S. J. Holt.
Environmental Conservation, Vol 1, No 2, p 138, 1974.

Descriptors: *International law, *United Nations, *Law of the sea, International waters, Foreign countries, Exploitation, Mining, Regulation, Governments, Treaties, Political constraints, Boundary disputes, Legal aspects, Administration, Beds, Beds under water, Management, International commissions, Governmental interrelations.
Identifiers: *United Nations Conference on the Law of the Sea(UNCLOS), *Non-governmental organizations(NGO's), *Pecem in Maribus, Territorial waters.

During 1974, representatives of many governments met to frame a new body of laws for the governance of the ocean and its resources. Under the aegis of the United Nations Conference on the Law of the Sea (UNCLOS), participants agreed to consider practically all aspects of interrelated marine problems, including minerals, pollution, fisheries, and territorial waters. Many non-governmental organizations (NGO's) have also expressed their concern over the growing tendency of states to extend their authority over ocean space. Such groups advocate international management not only of the international seabed, but of ocean space as a whole, including the water column above, all ocean resources, and even the air space above the oceans. These NGO's are seeking a common position on the main policy issues of the Law of the Sea Conference. (Parrish-FLorida)
W76-00922

WEATHER MODIFICATION LAW DEVELOPMENTS,
Arizona Univ., Tucson.
For primary bibliographic entry see Field 2B.
W76-00923

DEPARTMENT OF NATURAL RESOURCES V MAYOR AND COUNCIL OF OCEAN CITY (ACTION BY OWNER OF LAND TO REAR OF OCEAN FRONT TRACT TO ENJOIN CONSTRUCTION OF CONDOMINIUM).
332 Atlantic Reporter, 2d series, p 630-644 (Ct. App. Md. 1975).

Descriptors: *Littoral, *Riparian land, *Water law, *Public rights, *Prescriptive rights, Maryland, Easements, Water rights, Recreation, Building codes, Regulations, Local governments, Land development, Land tenure, Judicial decisions.
Identifiers: *Public trust, *Shoreline, Implied dedication, Condominiums, Foreshore, Public easements, Littoral proprietorship, Injunctions, Custom.

Plaintiff, owner of land behind a proposed ocean-front condominium site, sued to enjoin construction of the condominium on the grounds that the general public has acquired an easement between the mean high water mark and the line of vegetation, and construction of the building between those lines would deny public use of the beach. The Maryland Court of Appeals held that implying a dedication solely through long public use consititued prescription. Thirteen years of public use failed to meet that test. Defendant's activities were not a violation of the public trust when it was unclear whether property which was not shoreline at the time of the state charter was later subject to the reservation. Moreover, mere expenditure of public funds on restoring the dunes did not impress the property with a public trust. The court also rejected plaintiff's argument that fast land inundated by mean high water reverts to state ownership when submersion is caused by avulsion, rather than gradual erosion. Temporary flooding which does not change the land does not effect a reversion. The dissent argued that the public easement could be predicated on the theory of an implied dedication. Judgement was for defendant. (Jenkins-Florida)
W76-00936

AMENDING THE WILD AND SCENIC RIVERS ACT OF 1968 BY DESIGNATING A SEGMENT OF THE NEW RIVER AS A POTENTIAL COMPONENT OF THE NATIONAL WILD AND SCENIC RIVERS SYSTEM.
Report--Committee on Interior and Insular Affairs, House of Representatives, Report No 93-1419, 93d Cong, 2d Sess, October 3, 1974. 23 p.

Descriptors: *Wild River Act, *Administrative decisions, *Legislation, *Interstate rivers, North Carolina, Virginia, West Virginia, Administrative agencies, Governmental interrelations,

Hydroelectric plants, Hydroelectric project licensing, Institutional constraints, Hydroelectric power, Federal Power Act.
Identifiers: Wilderness areas, New River, Energy crisis, Congressional hearings, Dam effects, Environmental impact statements, Department of the Interior, Federal Power Commission(FPC).

S. 2439 amends the Wild and Scenic Rivers Act of 1968 by designating a segment of the New River as a Potential component of the national wild and scenic rivers system. The amended bill authorizes the Secretary of Interior to complete a study of the river and report the results to the President and the Congress within two years of enactment of the legislation. Further legislation is required to actually designate any part of the New River as a component of the national wild and scenic rivers system. The southern fork of New River which flows from northwestern North Carolina into Virginia has been identified by a statewide assessment as having primary recreational importance. The Federal Power Commission has licensed a hydroelectric project, the Blue Ridge Project, to be constructed on the upper New River. The dam would innundate nearly 100 miles of the New River. The Environmental Protection Agency (EPA) has questioned the recreational value of the project. The Federal Power Commission has argued that New River is neither legally wild nor scenic and has minimal recreational value. In the dissent to the subcommittee report, it was argued that passage of S. 2439 would effectively kill the Blue Ridge Project. (Jenkins-Florida)
W76-00937

MAINTENANCE OF TARRYTOWN HARBOR, NEW YORK, NAVIGATION PROJECT (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, New York.
For primary bibliographic entry see Field 8A.
W76-00940

FLOOD CONTROL ON SAGINAW RIVER, MICHIGAN AND TRIBUTARIES, FLINT RIVER AT FLINT, SWARTZ AND THREAD CREEKS, SECTIONS C-1 AND D, MICHIGAN (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Detroit, Mich.
For primary bibliographic entry see Field 8A.
W76-00941

REPLACEMENT OF LOCK AND DAM 7 AND LOCK 8, MONONGAHELA RIVER PENNSYLVANIA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Pittsburgh, Pa.
For primary bibliographic entry see Field 8A.
W76-00943

COLUMBIA AND LOWER WILLAMETTE RIVERS BELOW VANCOUVER, WASHINGTON AND PORTLAND, OREGON, SLAUGHTERS BAR REACH (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Portland, Oreg.
For primary bibliographic entry see Field 8A.
W76-00944

CHEMEHUEVI TRIBE OF INDIANS V FEDERAL POWER COMMISION (ACTION TO DETERMINE JURISDICTION OF FPC OVER THERMAL ELECTRIC POWER PLANTS LOCATED ON NAVIGABLE STREAMS).
For primary bibliographic entry see Field 6E.
W76-00947

TEMPLETON V. HUSS (ACTION FOR INJUNCTIVE RELIEF FOR INCREASED SURFACE WATER RUNOFF).
For primary bibliographic entry see Field 4B.
W76-00953

BLOUNT ISLAND DEVELOPMENT, JACKSONVILLE, FLORIDA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Jacksonville, Fla.
For primary bibliographic entry see Field 8A.
W76-00957

MARBLE BLUFF DAM AND PYRAMID LAKE FISHWAY, WASHOE PROJECT, NEVADA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Bureau of Reclamation, Sacramento, Calif. Mid-Pacific Regional Office.
For primary bibliographic entry see Field 8A.
W76-00958

GAS HOUSE COVE (EAST HARBOR FACILITY), SAN FRANCISCO MARINA SMALL CRAFT HARBOR, CALIFORNIA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineers District, San Francisco, Calif.
For primary bibliographic entry see Field 8A.
W76-00959

NAVIGATION OF THE KANSAS RIVER, LAWRENCE TO THE MOUTH (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Kansas City, Mo.
For primary bibliographic entry see Field 8A.
W76-00960

PERMIT APPLICATION BY RADCLIFF MATERIALS, INC. DREDGING OF DEADREEF SHELLS, MOBILE BAY, ALABAMA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Mobile, Ala.
For primary bibliographic entry see Field 8H.
W76-00961

LAKE BLUFF BEACH EROSION CONTROL, ILLINOIS (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Chicago, Ill.
For primary bibliographic entry see Field 8A.
W76-00962

POLLUTION OF THE HIGH SEAS: THE OCEANS AS INTERNATIONAL RIVERS,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00964

MARINE POLLUTION CONTROL AND MAN-MADE ISLANDS,
North Carolina State Univ., Raleigh.
S. A. Butts, III.
In: Legal Measures Concerning Marine Pollution, Sea Grant Publication UNC-SG-75-04, p 25-44, February 1975. 179 ref.

Descriptors: *Federal Water Pollution Control Act, *Island, *Floats, *Environmental effects, *Rivers and Harbors Act, Aquatic habitats, Legislation, Natural resources, Water resources, Oceans, Oil, International law, International waters, Legal aspects, Jurisdiction, Water rights, Law of the sea, Water law, Water resources development.
Identifiers: *Man-made islands, *Floating structures, *Coastal Zone Management Act.

Man-made islands may be divided into four categories differentiated on the basis of their construction: floating structures maintained in a fixed position by attachment to the ocean floor; structures fixed on sea floor by means of caisson-like tubes sunk into the bottom; concrete structures; and islands created by the dumping of natural materials, such as rock and gravel. Environmental objections have been raised regarding such man-made islands, with particular focus on oil related structures. National and international pollution laws which pertain to man-made islands are summarized. Special attention is directed towards oil drilling platforms and superports, constructed and operated by the United States or its citizens. Legislation explored includes the Federal Water Pollution Control Act Amendments of 1972; the Rivers and Harbors Act of 1899; the Outer Continental Shelf Lands Act; the Ports and Waterways Safety Act of 1972; Coastal Zone Management Act of 1972; the National Environmental Policy Act of 1969; Marine Protection, Research, and Sanctuaries Act of 1972; and the proposed Deepwater Port Act. In addition, an analysis of pertinent international law is presented. (See also W76-00963) (Hoffman-Florida)
W76-00966

BIG CYPRESS NATIONAL PRESERVE (PART 2-APPENDIX).
For primary bibliographic entry see Field 4C.
W76-00970

GREENVILLE HARBOR, MISSISSIPPI (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Vicksburg, Miss.
For primary bibliographic entry see Field 8A.
W76-00971

GEORGETOWN CREEK WATERSHED PROJECT, BEAR LAKE COUNTY, IDAHO (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Soil Conservation Service, Boise, Idaho.
For primary bibliographic entry see Field 8A.
W76-00972

HAYS, KANSAS, FLOOD PROTECTION PROJECT (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Kansas City, Mo.
For primary bibliographic entry see Field 8A.
W76-00973

CHIPOLA NURSERIES, INC. V. DIVISION OF ADMINISTRATION, DEPARTMENT OF TRANSPORTATION (APPEAL OF EMINENT DOMAIN PROCEEDING FOR VIOLATION OF NEPA).
For primary bibliographic entry see Field 6A.
W76-00979

LEGAL ASPECTS OF PHOSPHATE MINING IN NORTH CAROLINA,
North Carolina State Univ., Raleigh.
M. A. Almond.
Sea Grant Publication UNC-SG-75-05, February, 1975. 29 p, 167 ref, append.

Descriptors: *North Carolina, *Phosphates, *Mining, *Environmental effects, Dreding, Excavation, Exploitation, Exploration, Underground structures, Balance of nature, Ecology, Aquatic habitats, Eutrophication, Regulations, Remedies, Land reclamation, Groundwater, Air pollution, Fertilizers, Minerology.
Identifiers: Underwater mining, Phosphate mining.

The removal of phosphates from beneath navigable waters in North Carolina may produce adverse effects upon marine life adjacent to the operation. On the other hand, the phosphate is critically needed to provide fertilizer to increase crop yields in a hungry world. The pertinent state statutes and legal thinking likely to be used in the administrative or legal solution of this problem are analyzed. The on-land phosphate mining process can cause environmental problems in three areas: air pollution, land reclamation, and groundwater. Underwater mining could also cause major problems, such as salt water intrusion, eutrophication, and ir-

reparable damage to the state's shrimp industry. Several legal remedies are explored that might insure that the future development of phosphate mining is consistent with the preservation of estuarine resources. These remedies are governmental regulations, private remedies, contractual remedies, and the good faith of the mining industry. Any such solutions must depend in large part on the presence and spirit of one corporation, Texasgulf, Inc.; mainly because Texasgulf is at present the only company mining phosphate in the state. (Hoffman-Florida)
W76-00984

TRANSACTIONS OF THE THIRTY-EIGHTH NORTH AMERICAN WILDLIFE AND NATURAL RESOURCES CONFERENCE, WASHINGTON, D.C., MARCH 18-21, 1973.
Wildlife Management Institute: Washington, D.C., 1973, 525 p, Illus, Maps.

Descriptors: *Priorities, *Natural resources, Human Population, Oil shales, Conferences.
Identifiers: Coastal zone.

This volume contains papers on various aspects of natural resources and national priorities. Part 1 discusses actions needed to benefit resources and people, covering such topics as science and society in the age of environment and impact of population growth on resources and the environment. The status and needs of rare and endangered species is discussed including such topics as dwindling and endangered ungulates of Chile and comparative productivity of 5 bald eagle populations. A section on planning for intensive resource management covers Canada's inventory of land-wildlife capabilities and political economy of water resources development. Balancing human, wildlife and fish needs are discussed in relation to such topics as restricting human use of public lands in North America and environmental planning for oil shale production in western Colorado, USA. The final section, priorities in resource management, discusses balancing demands for natural resources, federal organization to meet resource needs and a progress report on coastal zone management. Lists of literature cited as well as discussion accompanies the contributed papers. Individual papers are indexed in BIORESEARCH INDEX.--Copyright 1974, Biological Abstracts, Inc.
W76-00997

7. RESOURCES DATA

7A. Network Design

STUDIES ON OPERATIONS PLANNING AND CONTROL OF WATER DISTRIBUTION SYSTEMS,
Systems Control, Inc., Palo Alto, Calif.
For primary bibliographic entry see Field 6A.
W76-00506

7B. Data Acquisition

A GEOPHYSICAL METHOD FOR DETERMINATION OF AQUIFER PARAMETERS OF HARD ROCKS,
Central Water and Power Research Station, Poona (India).
For primary bibliographic entry see Field 2F.
W76-00529

EMPIRICAL METHODS OF USING SOILS AS RADIATION DOSIMETERS,
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
For primary bibliographic entry see Field 5A.
W76-00542

A DUAL-INTERVAL, LIGHT-ACTIVATED SIGNAL GENERATOR--ITS APPLICATION TO SEDIMENT SAMPLING,
Agricultural Research Service, Chickasha, Okla.
For primary bibliographic entry see Field 2J.
W76-00543

DEPOSITION RATES IN VALLEYS DETERMINED USING FALLOUT CESIUM-137,
Agricultural Research Service, Oxford, Miss. Sedimentation Lab.
For primary bibliographic entry see Field 2J.
W76-00547

WATER MONITORING STATIONS,
Honeywell, Inc., Minneapolis, Minn.
For primary bibliographic entry see Field 5A.
W76-00605

HYDROLOGIC DATA NETWORK FOR THE OSWEGO RIVER BASIN, NEW YORK,
Geological Survey, Albany, N. Y.
J. M. Whipple, and K. I. Darmer.
Administrative Report, September 1975. 64 p, 3 fig, 2 plate, 8 tab, 46 ref, append.

Descriptors: *Hydrologic data, *Network design, *Data transmission, *Satellites(Artificial), *New York, River basins, Water quality, Streamflow, Lakes, Water levels, Runoff, Flood forecasting, Planning, Methodology, Remote sensing, Telometry.
Identifiers: *Oswego River basin(NY), Real-time data.

Data from proposed ultimate real-time data network of 17 precipitation gages, 33 stream- flow stations, and 11 lake-stage stations would be transmitted to a central location for use in flood forecasting and in providing for optimum use of the water resources of the Oswego River basin in New York. A three-phase implementation of the network is proposed to provide (1) new data-collection stations, (2) perfection of transmission of data by satellite, and (3) ultimate conversion to a real-time data system. (Woodard-USGS)
W76-00654

APPLICATION OF MICROWAVE WATER SENSING TECHNIQUES TO WATERSHEDS,
Montana State Univ., Bozeman. Dept. of Electrical Engineering.
B. R. McLeod.
Available from the National Technical Information Service, Springfield, Va 22161 as PB-246 196, $3.75 in paper copy, $2.25 in microfiche. Research Report No 67, Montana University Joint Water Resources Research Center, Bozeman, July 1975. 35 p, 8 fig, 9 tab, 2 ref. OWRT A-079-MONT(1).

Descriptors: *Instrumentation, *Moisture meters, *Electronic equipment, *Microwaves, *Watershed management, Measurement, *Moisture content, Humidity, Litter, *Forests watersheds.
Identifiers: *Microwave meters, Forestry instrumentation.

The feasibility of applying microwave moisture sensing techniques to the area of watershed management is discussed. A portable, field-usable microwave meter was developed to given rapid, accurate moisture information on such forest fuels as litter, duff, and dead sticks between 1/4 and 1/2 inch in diameter. The meter weighs 23 pounds, is powered by two rechargeable batteris, and is packaged in a small fiberglass case that insures the meter will operate in a field environment such as a fire camp. The unit has been field-tested for three years with the final year's data being used to calibrate the meter. The project also produced a second type of meter using the same principle of microwave moisture sensing. This instrument monitors, on a real-time basis, changes in forest fuel moisture content in response to changes in external stimuli such as humidity changes. Preliminary results show very rapid changes in moisture content for litter as compared to presently accepted numbers for the time rate of change of the moisture content of litter. (Holje-Montana State)
W76-00675

INVESTIGATION OF THE ORION RESEARCH CYANIDE MONITOR,
Environmental Protection Agency, Cincinnati, Ohio.
For primary bibliographic entry see Field 5A.
W76-00677

SEWERAGE SYSTEM MONITORING AND REMOTE CONTROL,
Detroit Metro Water Dept., Mich.
For primary bibliographic entry see Field 5D.
W76-00691

ESTIMATING EVAPORATION: A TECHNIQUE ADAPTABLE TO REMOTE SENSING,
Agricultural Research Service, Phoenix, Ariz. Water Conservation Lab.
For primary bibliographic entry see Field 2D.
W76-00701

AN AUTOMATIC PUMPING SAMPLER FOR EVALUATING THE TRANSPORT OF PESTICIDES IN SUSPENDED SEDIMENT,
For primary bibliographic entry see Field 5B.
W76-00728

SMALL TENSIOMETERS FOR FIELD AND LABORATORY STUDIES,
Agricultural Research Service, Gainesville, Fla.
For primary bibliographic entry see Field 2G.
W76-00733

CONTINUOUS READING LOW RANGE TURBIDIMETER MODEL 1720.
Hach Bulletin 1720-3ED, 1971. 2 p, 3 fig.

Descriptors: *Instrumentation, *Turbidity, *Treatment facilities, Water quality, Monitoring, Equipment.
Identifiers: Formazin Turbindity Unit(FTU), *Turbidimeter.

The model 1720 Hach Low Range Turbidimeter offers water treatment plants an economical way of providing continuous information about finished water quality. With the lowest of its four ranges, this instrument can measure turbidities as low as 0.04 Formazin Turbidity Unit (FTU). Measurement of turbidity is accomplished by passing a strong beam of light through the sample. Turbidity, present as fine particles, scatters a portion of the light beam which is measured by two photocells submerged in the sample; an indication is obtained on the readout meter. This maintenance-free instrument has a response time to detect a change in turbidity of 30 seconds requiring a sample of 1/4 to 1/2 gallon/minute and measures 32 inches in length by 4 1/8 inches in diameter. (Sandoski-FIRL)
W76-00764

EVALUATION OF SURFACE WATER RESOURCES FROM MACHINE-PROCESSING OF ERTS MULTISPECTRAL DATA,
Indiana State Univ., Terre Haute. Dept. of Geography and Geology.
For primary bibliographic entry see Field 5G.
W76-00833

ASSESSING SOIL SALINITY AND IDENTIFYING POTENTIAL SALINE-SEEP AREAS WITH FIELD SOIL RESISTANCE MEASUREMENTS,
Agricultural Research Service, Sidney, Mont.

For primary bibliographic entry see Field 3C.
W76-00835

FIELD TEST OF SOIL WATER FLUX METERS,
Agricultural Research Service, Riverside, Calif. Salinity Lab.
For primary bibliographic entry see Field 2G.
W76-00838

ELECTROLYTIC WATER TESTER-FOR DETERMINATION OF OXYDANT OR REDUCING AGENT CONTENT.
For primary bibliographic entry see Field 5D.
W76-00841

FLOATING ICE THICKNESS AND STRUCTURE DETERMINATION--HEATED WIRE TECHNIQUE,
Department of the Environment, Ottawa (Ontario). Inland Waters Directorate.
For primary bibliographic entry see Field 2C.
W76-00884

IN SITU COLOUR MEASUREMENTS ON THE GREAT LAKES,
Canada Centre for Inland Waters, Burlington(Ontario).
For primary bibliographic entry see Field 5A.
W76-00885

PERFORMANCE CHARACTERISTICS OF 'BULK EFFECT' HUMIDITY SENSORS,
National Bureau of Standards, Washington, D. C., Mechanics Div.
J. W. Little, S. Hasewaga, and L. Greenspan.
Available from the National Technical Information Service, Springfield, Va 22161 as COM-74-11784, $4.00 in paper copy, $2.25 in microfiche.
NBSIR 74-477, 1974. 31 p, 5 fig, 9 tab, 7 ref.

Descriptors: *Humidity, *Temperature, Hysteresis, Standards, Calibrations, Air temperature, Instrumentation, Measurement, Water vapor, Hygrometry, Laboratory tests, Climates.
Identifiers: *Humidity sensor, *Aluminum oxide, Ambient temperature, Sensitivity, Hysteresis loop, Calibration scatter, Bulk effect, 'Brady Array' sensor.

A laboratory study was made of the performance of 'Brady Array' humidity sensors over a range of ambient temperature from -40 to + or -20C encompassing relative humidities from 0 to 90%. The manufacturer categorized this sensor as a solid-state semiconductor device comprising a 'precise array of crystals and interstitial spaces.' It was mounted within a slotted TO-5 transistor enclosure. An excitation oscillator, driven by a dc input of 15 volts, provided a 5-volt rms 1000-Hz signal to the sensor and a demodulator provided a dc output signal varying in magnitude from 0 to 5 volts. This dc signal was measured with a digital voltmeter calibrated to within + or -0.3 mV or less for all measurements reported. Each of two excitation oscillators was connected through appropriate cables to five sensors and demodulators. There was great variability in the set of ten sensors used in the study. The sensitivity of individual sensors varied by a factor of at least three. There was considerable ambient temperature effect, so that each sensor had to be calibrated according to the temperature range of the intended use. Sensors were not as useful at low temperatures or low relative humidities as at higher temperatures and relative humidities. (Roberts-ISWS)
W76-00886

7C. Evaluation, Processing and Publication

WATER RESOURCES OF HANCOCK COUNTY WITH EMPHASIS ON GROUND-WATER AVAILABILITY,
Indiana Dept. of Natural Resources, Indianapolis. Div. of Water.
J. E. Uhl.
Annotated Map, 1975. Folded sheet, 4 fig, 6 tab, 1 map.

Descriptors: *Water resources, *Groundwater availability, *Maps, *Indiana, Groundwater, Surface waters, Water quality, Geology, Water sources, Water supply, Aquifers, Groundwater resources, Wells, Water yield, Hydrogeology.
Identifiers: Hancock County(Ind).

Potential yield from groundwater supplies in Hancock County, Indiana, were plotted on a large scale map (1 inch=1 mile). Other related information was presented on the reverse side of the map. Data on the geography, population, climate, surface water, water quality, and geology of the county were included. The three existing public water supplies in Hancock County were described. (Sims-ISWS)
W76-00534

INTERNATIONAL FIELD YEAR FOR THE GREAT LAKES.
National Oceanic and Atmospheric Administration, Rockville, Md.
For primary bibliographic entry see Field 2H.
W76-00535

A CONTINUOUS GARGANTUAN TASK FOR SEVERN TRENT,
Severn Trent Water Authority (England).
For primary bibliographic entry see Field 5A.
W76-00640

THE SURFACE WATER SUPPLY OF THE UNITED STATES, 1966-70: PART 4. ST. LAWRENCE RIVER BASIN--VOLUME 1. BASINS OF STREAMS TRIBUTARY TO LAKES SUPERIOR, MICHIGAN, AND HURON,.
Geological Survey, Reston Va.
Available from Supt. of Documents, GPO, Wash. D.C. 20402, price $5.10 Geological Survey Water-Supply Paper 2111, 1974. 754 p, 1 fig.

Descriptors: *Basic data collections, *Surface waters, *Streamflow, *Flow rates, *St. Lawrence River, River basins, Lake Superior, Lake Michigan, Lake Huron, Discharge(Water), Gaging stations, Flow measurement, Average flow, Water levels, Lakes, Reservoirs, Hydrologic data.
Identifiers: Maximum discharges, Minimum discharges.

This report is one of a series of 37 reports presenting records of stage and discharge of streams, and of stage and contents of lakes and reservoirs in the United States during the 1966-70 water years; it contains the records for gaging stations and partial-record stations in the St. Lawrence River basin, streams tributary to Lakes Superior, Michigan, and Huron. This is one of the second series of water-supply papers to be published on a 5-year basis. The first series covered the 5-year period October 1, 1960, to September 30, 1965. This series covers the period October 1, 1965, to September 30, 1970. The daily table for stream-gaging stations gives the mean discharge for each day and is followed by monthly and yearly summaries of total, average, maximum, and minimum discharges. (Woodard-USGS)
W76-00651

GROUND-WATER LEVELS IN THE UNITED STATES, 1969-73: SOUTH-EASTERN STATES.
Geological Survey, Reston, Va.
Available from Supt. of Documents, GPO, Wash., D.C. 20420, price $2.45. Water-Supply Paper 2171, 1975. 250 p, 12 fig, 3 ref.

Descriptors: *Basic data collections, *Groundwater, *Water wells, *Water levels, *Southeast U. S., Observation wells, Hydrologic data, Alabama, Florida, Georgia, Kentucky Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, West Virginai, Aquifers, Water utilization, Groundwater resources.

Five years (1969-73) of water-level measurements in 11 states in southeastern United States are given in feet with reference to either mean sea level or land-surface datum. Mean sea level is the datum plane on which the national network of precise levels is based; land-surface datum is a datum plane that is approximately at land surface at each well. If known, the altitude of the land-surface datum above mean sea level is given in the well description. The height of the measuring point above or below land-surface datum is given in each well description. Water levels in wells equipped with recording gages are reported for every fifth day and the end of each month. (Woodard-USGS)
W76-00652

GROUND-WATER BASIC DATA FOR GRANT AND SIOUX COUNTIES, NORTH DAKOTA,
Geological Survey, Bismarck, N. DAK.
P. G. Randich.
North Dakota, Geological Survey, Bismarck, County Ground-Water Studies 24--Part II, and North Dakota Geological Survey Bulletin 67--Part II, 1975. 303 p, 2 fig, 1 plate, 8 tab, 23 ref, append.

Descriptors: *Basic data collections, *Groundwater resources, *Water quality, *Lithologic logs, *North Dakota, Water wells, Well data, Aquifer characteristics, Hydrogeology, Water levels, Groundwater recharge, Streamflow, Low flow, Chemical analysis, Particle size.
Identifiers: *Grant County(ND), *Sioux County(ND).

Groundwater data for Grant and Sioux Counties, N. D., were collected chiefly between 1971 and 1974. The data include: (1) Geologic and hydrologic records for 1,610 wells and test holes; (2) water-level measurements in 77 observation wells; (3) lithologic and geophysical logs of 257 test holes and wells; (4) 135 chemical analyses of groundwater; (5) 15 chemical analyses of water from streams during low flow; (6) 13 chemical analyses of minor elements in water from wells; (7) 30 particle-size distribution graphs; and (8) 30 analyses of core samples for hydraulic parameters and heavy mineral content. (Woodard-USGS)
W76-00653

HYDROLOGIC DATA NETWORK FOR THE OSWEGO RIVER BASIN, NEW YORK,
Geological Survey, Albany, N. Y.
For primary bibliographic entry see Field 7B.
W76-00654

THE GROUND-WATER SITUATION IN THE CIRCLEVILLE AREA, PICKAWAY COUNTY, SOUTH-CENTRAL OHIO,
Geological Survey, Columbus, Ohio.
For primary bibliographic entry see Field 4B.
W76-00661

MAP SHOWING FLOOD-PRONE AREAS, COLORADO SPRINGS-CASTLE ROCK AREA, FRONT RANGE URBAN CORRIDOR, COLORADO,
Geological Survey, Denver, Colo.
J. F. McCain, and W. R. Hotchkiss.

For sale by USGS, Reston, Va 22090, price $0.75. Miscellaneous Investigations Services Map I-857-C, 1975. 1 sheet, 1 map, 9 ref.

Descriptors: *Flood plains, *Maps, *Urbanization, *Flood protection, *Colorado, Flood frequency, Land development, Land use, Streamflow, Flow characteristics, Hydrologic data, Flood plain zoning, Watershed management.
Identifiers: *Colorado Springs(Colo), *Castle Rock area(Colo).

The rapid growth of population in the Front Range Urban Corridor of Colorado is causing intense competition for available land resources. One form of competition posing serious problems is unregulated development along natural watercourses. This map depicts a broad-scale view of flood-prone areas along principal streams in the Colorado Springs-Castle Rock area of the urban corridor. Flood-prone areas identified are subject to inundation by the 100-year flood, a flood having a 1 percent change of being equaled or exceeded in any given year. The magnitude and depth of the reference flood were derived for streams in the study area from streamflow records and reports of the U.S. Geological Survey and from reports of the U. S. Army Corps of Engineers. (Woodard-USGS)
W76-00668

MAP SHOWING AVAILABILITY OF HYDROLOGIC DATA PUBLISHED AS OF 1974 BY THE U.S. ENVIRONMENTAL DATA SERVICE AND BY THE U.S. GEOLOGICAL SURVEY AND COOPERATING AGENCIES, COLORADO SPRINGS-CASTLE ROCK AREA, FRONT RANGE URBAN CORRIDOR, COLORADO,
Geological Survey, Denver, Colo.
L. O. Anna.
For sale USGS, Reston, Va 22092, price $0.75. Miscellaneous Investigations Series Map I-857-D, 1975. 1 sheet, 1 map, 26 ref.

Descriptors: *Hydrologic data, *Maps, *Surface waters, *Groundwater, *Colorado, Sites, Climatic data, Streamflow, Water quality, Publications, Information retrieval, Watershed management, Planning, Urbanization.
Identifiers: *Colorado Springs, *Castle Rock area(Colo).

This map shows by symbols and color the hydrologic data published as of January 1974 for the Colorado Springs-Castle Rock Colo., area by the U.S. Environmental Data Service and by the U.S. Geological Survey and cooperating agencies. All sources of the data are given in the references and are referred to in the discussion. Of the 44 climatological stations shown the longest precipitation records are for Fountain, Colo., beginning in 1866. Colorado Springs' precipitation records begin in 1871. Surface-water data include continuous records of stage and discharge of streams. Location of 16 surface-water data sites are shown; included are 7 continuous-record stream-stage and discharge stations, and 4 staff-gage stream discharge sites. Streamflow records were collected as early as 1908. Groundwater data sites plotted on the map represent 40 wells where water levels have been measured periodically for 4 or more years or monthly for at least 1 year, and 49 wells from which water samples have been analyzed for dissolved-chemical constituents. (Woodard-USGS)
W76-00669

HYDROLOGIC UNIT MAP--1974, STATE OF NORTH CAROLINA.
Geological Survey, Reston, Va.
For sale by USGS, Reston, Va 22092, price $1.25. Hydrologic Unit Map of North Carolina, 1975. 1 sheet, 1 map.

Descriptors: *Maps, *Hydrology, *North Carolina, Water resources, Data collections, Planning, Hydrologic systems, Regions.
Identifiers: *Hydrologic unit maps(NC), *Hydrologic boundaries, Subregional boundaries, Accounting unit boundaries, Cataloging unit boundaries.

This map and accompanying table show Hydrologic Units in North Carolina that are basically hydrographic in nature. The Cataloging Units shown will supplant the Cataloging Units previously used by the U.S. Geological Survey in its Catalog of Information on Water Data (1966-72). The Regions, Subregions and Accounting Units are aggregated of the Cataloging Units. The Regions and Subregions are currently (1974) used by the U.S. Water Resources Council for comprehensive planning, including the National Assessment, and as a standard geographical framework for more detailed water and related land-resources planning. The Accounting Units are those currently (1974) in use by the U.S. Geological Survey for managing the National Water Data Network. (Woodard-USGS)
W76-00670

HYDROLOGIC UNIT MAP--1974, STATE OF FLORIDA.
Geological Survey, Reston, Va.
For sale by USGS, Reston, Va 22092, price $1.25. Hydrologic Unit Map of Florida, 1975. 1 sheet, 1 map.

Descriptors: *Maps, *Hydrology, *Florida, Water resources, Data collections, Planning, Hydrologic systems, Regions.
Identifiers: *Hydrologic unit maps(Fla), *Hydrologic boundaries, Subregional boundaries, Accounting unit boundaries, Cataloging unit boundaries.

This map and accompanying table show Hydrologic Units in Florida that are basically hydrologic in nature. The Cataloging Units shown will supplant the Cataloging Units previously used by the U.S. Geological Survey in its Catalog of Information on Water Data (1966-72). The Regions, Subregions and Accounting Units are aggregates of the Cataloging Units. The Resions and Subregions are currently (1974) used by the U.S. Water Resources Council for comprehensive planning, including the National Assessment, and as a standard geographical framework for more detailed water and related land-resources planning. The Accounting Units are those currently (1974) in use by the U.S. Geological Survey for managing the National Water Data Network. (Woodard-USGS)
W76-00671

STORM WATER MANAGEMENT MODEL: DISSEMINATION AND USER ASSISTANCE,
University City Science Center, Philadelphia, Pa.
For primary bibliographic entry see Field 5G.
W76-00678

ADVANCED AUTOMATIC CONTROL STRATEGIES FOR THE ACTIVATED SLUDGE TREATMENT PROCESS,
Systems Control, Inc., Palo Alto, Calif.
For primary bibliographic entry see Field 5D.
W76-00693

URBAN STORMWATER MANAGEMENT MODELING AND DECISION-MAKING,
Florida Univ., Gainesville. Dept. of Environmental Engineering Sciences.
For primary bibliographic entry see Field 5D.
W76-00695

THE VALUE OF VEGETATION FOR CONSERVATION I. FOUR LAND AREAS IN BRITAIN,
Nature Conservancy, Grange-over-Sands (England). Merlewood Research Station.
For primary bibliographic entry see Field 2I.
W76-00736

THE VALUE OF VEGETATION FOR CONSERVATION II. M1 MOTORWAY AREA,
Nature Conservancy, Grange-over-Sands (England). Merlewood Research Station.
For primary bibliographic entry see Field 2I.
W76-00737

SCALE-UP AND PROCESS DESIGN TECHNIQUES FOR FIXED FILM BIOLOGICAL REACTIONS,
Quirk, Lawler and Matusky, New York.
For primary bibliographic entry see Field 5D.
W76-00788

MODELS FOR GROUNDWATER ANALYSIS,
Harvard Univ., Cambridge, Mass.
For primary bibliographic entry see Field 4B.
W76-00816

SOME ASPECTS OF GROUNDWATER EXPLOITATION AND THE USE OF GROUNDWATER MODEL IN THE MIRES BASIN IN CRETE, GREECE.
For primary bibliographic entry see Field 4B.
W76-00820

EVALUATION OF SURFACE WATER RESOURCES FROM MACHINE-PROCESSING OF ERTS MULTISPECTRAL DATA,
Indiana State Univ., Terre Haute. Dept. of Geography and Geology.
For primary bibliographic entry see Field 5G.
W76-00833

GROUND-WATER LEVELS, 1968-1972,
Oregon State Engineer's Office, Salem.
W. S. Bartholomew, M. E. Graham, and J. Feusner.
Ground Water Report 18, November 1973. 134 p, 16 fig, 49 ref.

Descriptors: *Groundwater, *Water levels, *Hydrographs, *Oregon, Water wells, Aquifers, Water resources, Groundwater resources, Hydrologic cycle, Groundwater recharge, Groundwater movement, Water pollution, Management, Water management(Applied), *Data collections.

The activities of the Ground Water Division under the Oregon State Engineer were reviewed. Five critical groundwater areas were described. In these areas, expanding groundwater exploitation and an increasing number of wells has resulted in the over-development of groundwater reservoirs. Groundwater flow systems were described. Several well hydrographs in each of 28 groundwater areas of Oregon were presented. A list of all observation wells was provided. (Sims-ISWS)
W76-00887

SUMMARY OF GROUND WATER QUALITY IN THE LOS ANGELES DRAINAGE PROVINCE,
California Dept. of Water Resources, Los Angeles. Southern District.
G. H. Nishimura, R. Baldridge, P. Tiffany, and A. G. Arce.
District Report, November 1973. 173 p, 60 fig, 4 tab, 2 ref, 2 append.

Descriptors: *Groundwater, *Water quality, *California, *Water chemistry, Data collections, Dissolved solids, Chlorides, Sulfates, Nitrates, Fluorides, Boron, Hardness(Water), Chemical analysis, Wells, Groundwater resources, Aquifers, Histograms.
Identifiers: *Los Angeles Drainage Province.

Groundwater quality data for the Los Angeles Drainage Province were presented in tables and figures. Statistics for chemical and other parameters were tabulated by hydrologic subunit and subarea. Histograms depicted the frequency distribution of available data and of total dissolved solids (TDS), chloride, sulfate, nitrate, fluoride, boron, and total hardness concentrations. The histograms were also presented for each subunit and subarea of the basin. (Sims-ISWS)
W76-00888

ROLE OF SYNTHETIC TIME SERIES IN HYDROMETEOROLOGICAL DATA ANALYSIS,
Central and Southern Florida Flood Control District, West Palm Beach.
For primary bibliographic entry see Field 2A.
W76-00891

8. ENGINEERING WORKS

8A. Structures

GROUND WATER POLLUTION FROM SUBSURFACE EXCAVATIONS, PART X, SEWER LEAKAGE.
Environmental Protection Agency, Washington, D.C.
For primary bibliographic entry see Field 5B.
W76-00527

TUNNELING MAKES RIVERSIDE INTERCEPTOR FEASIBLE,
Black and Veatch, Kansas City, Mo.
For primary bibliographic entry see Field 5D.
W76-00778

LOADER USED TO SPEED SEWER TUNNEL CONSTRUCTION.
For primary bibliographic entry see Field 5D.
W76-00780

CHARACTERISTICS AND COUNTERMEASURES AGAINST URBAN RIVER FLOODS (TOSHI KASEN NO SUIGAI NO TOKUSEI TO TAISAKU),
For primary bibliographic entry see Field 4A.
W76-00805

A LABORATORY TEST OF SOME DRAIN TUBE FILTER MATERIALS,
McGill Univ., Montreal (Quebec).
For primary bibliographic entry see Field 8G.
W76-00832

ANNUAL REPORT 1974.
New South Wales Univ., Kensington(Australia). Water Research Lab.
For primary bibliographic entry see Field 9C.
W76-00883

MAGIC ISLAND...TEN YEARS AFTER,
Belt, Collins and Associates Ltd., Honolulu, Hawaii.
T. F. Nance, and P. M. Hirota.
Shore and Beach, Vol. 42, No. 2, p 19-22, October 1974. 3 fig, 8 ref.

Descriptors: *Islands, *Waves(Water), *Beaches, *Erosion, *Breakwaters, *Circulation, *Hawaii, Lagoons, Sea walls, Construction, Design criteria, Performance.
Identifiers: *Peninsula, *Magic Island, *Swells, Run-up.

The initial plan for constructing an island on the one-mile reef in front of Honolulu's Ala Moana Park, and the work already performed were described. Only Ala Wai peninsula, a rubble mound breakwater fronting it, and two artificial beaches were completed. Environmental and public opposition halted the project and the island, called 'Magic Island' was not constructed. A detailed discussion was presented of the design criteria used for breakwater structures, considering wave run-up, wave heights and periods, slopes of the breakwater, and sizes of the stones used in the breakwater. The performance of the breakwater in the last 10 years was also explored. Overtopping of the breakwaters due to unusual smoothness of the breakwater front slope and subsequent erosion on the east side of the lagoon were reported. Presence of wind wave erosion was also noted on the west end of the lagoon beach. Parts of the lagoon beach have stablized on a slope of about 1:10. Despite these problems, the lagoon beach, seawall, and breakwater continue to function essentially as they were intended. (Bhowmik-ISWS)
W76-00889

MAINTENANCE OF TARRYTOWN HARBOR, NEW YORK, NAVIGATION PROJECT (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, New York.
Available from the National Technical Information Service, Springfield, Va 22161, as EIS-NY-73-1829-F, $4.00 in paper copy, $2.25 in microfiche. November 26, 1973. 43 p, 2 fig, 1 tab.

Descriptors: *Benthic fauna, *Dredging, *Channel improvement, *Channels, *Dimensions, Depth, Turbidity, Environmental effects, New York, Water quality.
Identifiers: *Environmental Impact statements, *Tarrytown, N.Y.

The project involves a maintenance activity consisting of dredging the existing federal navigation channel in Tarrytown Harbor, New York, to its authorized project dimensions. The spoil will be deposited in the Atlantic Ocean. Implementation will facilitate effectual and safe delivery by water of petroleum products and automobile parts to a densely populated region. The dredging will affect water quality and cause temporary turbidity. Benthic life will also be affected through the removal of bottom materials. Alternatives considered include alternative methods of spoil disposal or no maintenance. (Denvir-Florida)
W76-00940

FLOOD CONTROL ON SAGINAW RIVER, MICHIGAN AND TRIBUTARIES, FLINT RIVER AT FLINT, SWARTZ AND THREAD CREEKS, SECTIONS C-1 AND D, MICHIGAN (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Detroit, Mich.
Available from the National Technical Information Service, Springfield, Va 22161 as EIS-MI-73-0523-F, $6.00 paper copy, $2.25 microfiche. March 1973, 150 p, 33 fig, 6 plat.

Descriptors: *Flood control, *Flood protection, *Channel improvement, Flood stages, Stream flow, Michigan, Environmental effects, Floods, Trees, Brush, Streams, Channels, Flooding, Storage, Tributaries, Water quality.
Identifiers: *Environmental impact statements, *Flint River, Michigan, Contiguous zone.

The project involves Flint River, Michigan, flood control improvements authorized by the Flood Control Act of 1958. The project consists of channel realignments and modification of 11,000 feet of the main stem of the Flint River and 8,900 feet of its tributaries. The program contemplates construction of a concrete-lined channel and concrete floodwalls for the river and an improved earth channel with raised levels along certain sections of the tributaries. The completed project will provide flood protection for approximately 455 acres of land adjacent to the Flint River and its tributaries. This area, subject to periodic flooding, includes a concentrated industrial complex. The proposed action would have an adverse environmental impact upon the existing stream channesl and the immediate, contiguous areas by displacing biological communities through the excavations and the construction of the concrete channel. The flood protection plan would remove trees and brush along the creek, and also reduce park space through channel enlargements. Alternatives to the proposed action include reduction of the flood stage design; reliance on non-structural techniques; utilization of upstream storage sites to reduce flood stages at the Flint problem areas; and discontinuance of the project. (Gagliardi-Florida)
W76-00941

REPLACEMENT OF LOCK AND DAM 7 AND LOCK 8, MONONGAHELA RIVER PENNSYLVANIA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Pittsburgh, Pa.
Available from the National Technical Information Service, Springfield, Va 22161 as EIS-PA-73-1694-F, $3.50 in paper copy, $2.25 in microfiche. October 1973, 19 p, 3 map.

Descriptors: *Environmental effects, *Navigation, *Dam construction, *Locks, Dams, Pennsylvania, Rivers, Navigable rivers, Navigable waters, Water utilization, Water users, Dredging, Construction, Turbidity, Sediments, Sediment distribution.
Identifiers: *Environmental impact statements, *Fayette and Greene Counties(Pa), Dam effects.

The project involves the complete replacement of existing river navigation facilities at Lock and Dam 7 and Lock 8, Monongahela River, Fayette and Green Counties, Pennsylvania. The improvement of navigation facilities will provide measures and incentives for continuation of growth in development and expansion of waterway user industries. An environmental effect of the project will be a pool level increase of 15 feet, extending 2.8 miles from river mile 82.2 to 85.0. It is predicted that the primary adverse environmental impact will be related to construction activities resulting in increase turbidity and sediment deposits for a relatively short river reach downstream of the project facility. Alternatives suggested include: replacement of Lock and Dam 7 at locations other than the site chosen, changes in the level of pool, or no action at all. Comments have been received from the United States Bureau of Sports Fisheries and Wildlife and Federal Water Quality Administration and from Pennsylvania's Department of Environmental Resources. (Gagliardi-Florida)
W76-00943

COLUMBIA AND LOWER WILLAMETTE RIVERS BELOW VANCOUVER, WASHINGTON AND PORTLAND, OREGON, SLAUGHTERS BAR REACH (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Portland, Oreg.
Available from the National Technical Information Service, Springfield, Va 22161 as EIS-OR-73-1123-F $5.00 in paper copy, $2.25 in microfiche. December 15, 1972, 82 p, 12 fig.

Descriptors: *Channel improvement, *Basins, *Dredging, *Columbia River, Spoil banks, Environmental effects, Environment, Navigation, Channels, Rivers, Sediments, Habitats, Turbidity, Disposal, Fish, Wildlife habitats, Shoals, Washington, Oregon.
Identifiers: *Environmental impact statements, *Portland(Ore).

The project involves plans to continue construction of a 40-foot-deep by 600-foot-wide navigation channel at Slaughters Bar, and a 40-foot-deep by 1200-foot-wide, turning basin above the Longview Bridge. The project also entails plans to dispose of

dredge material on Cord Island, Oregon and Washington shores, with maintenance spoils being placed on Howard Island and the Oregon shore. The primary environmental impact of the project will be removal from the Columbia River of approximately 3.6 million cubic yards initially and 450,000 cubic yards annually of river bottom sediments. The adverse environmental effects will entail temporary increases in turbidity adjacent to and downstream of disposal areas and the temporary elimination of some wildlife and fish habitat. The secondary impacts associated with future industrialization will reduce and/or eliminate wildlife habitat on parts of the Oregon shore disposal area. Alternative proposal include: alternative plans for providing authorized channel and turning basin dimensions with provisions for reducing shoaling in the Slaughters Bar Reach; alternative disposal sites and uses of dredged materials; and no action. (Gagliardi-Florida)
W76-00944

PERMITS FOR ACTIVITIES IN NAVIGABLE WATERS OR OCEAN WATERS.
Federal Register, Vol 40, No 88, p 19766-19798, May 6, 1975.

Descriptors: *Dredging, *Permits, *Navigable waters, *Landfills, *Non-navigable waters, *Rivers and Harbors Act, Administration, United States, Legislation, Regulation, Administrative agencies, Artificial water courses, District of Columbia, Drainage, Erosion, Elevation, Swamps, Coastal plains, Coastal marshes, Inland waterways, Land forming, Mixing, Disposal, Specifications, Adoption of practices.
Identifiers: *Army Corps of Engineers, Disposal areas, Mixing zone, Administrative regulations.

Pursuant to the order of the U.S. District Court for the District of Columbia in NRDC v. Callaway, Civil Action No. 74-1242 (D. C. D. C. March 27, 1975), The Secretary of the Army herein proposes certain regulations to supersede those in 33CFR 209.120. All of the proposed changes pertain to the disposal of the dredged or fill material in water, or on land if the material might be worked back into water. They govern the procedures to be followed by the Corps of Engineers in requiring a Department of the Army permit for the water disposal of dredged material in every body of natural and artificial water in the U.S., and limting the types of waters for which a permit for dredging activities would be required. Public comment is invited on four different alternative regulations proposed. Appendices to the proposed rules include a statement of coordination and cooperation between the Secretaries of the Army and the Interior in regulating dredging activities, and guidelines for the delegation of authority in the issuing of permits. Proposed Part 230 covers other dredging related topics such as evaluation procedures, testing requirements, requirements for disposal sites, contaminated fill restrictions, and rules for the recording of disposal sites. (Parrish-Florida)
W76-00945

BLOUNT ISLAND DEVELOPMENT, JACKSONVILLE, FLORIDA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Jacksonville, Fla.
Available from the National Technical Information Service, Springfield, Va 22161 as EIS-FL-73-1292-F, $12.75 in paper copy, $2.25 in microfiche. August 3, 1973, 511 p.

Descriptors: *Bulkheads, *Dredging, *Industrial plants, Turbidity, Disposal, Weirs, Embankments, Grading, Environmental effects, Florida, Dikes, Road banks, Industries, Industrial production, Rivers.
Identifiers: *Environmental Impact Statements, *Jacksville(Fla).

The proposed action would authorize construction of a bulkhead and dredging operation in the St. Johns and Back River, Florida; placement of fill on upland and Back River sites; and grading and related operations in the vicinity of Blount Island. The purpose of the dredge and fill is to modify 950 acres of Blount Island, including 275 acres of Back River, for industrial development. Potential environmental impacts associated with the project are considered to be minimal. The impact on the surrounding community of an increase of 10,000 to 12,000 additional jobs resulting from the facility will be gradual. An adverse environmental effect will be the loss of whatever present and future contribution the 275 acres of Back River has to the total biological productivity of the St. Johns River. Biologists are in disagreement as to the magnitude and significance of that loss. There will also be a temporary increase in turbidity in the waters of the St. Johns River in the local vicinity of the dredging and disposal operations. The planned use and maintenance of weirs, dikes, and containment booms will limit the degree and extent of that increase. The alternatives to the proposed action are to maintain the status quo and select a different site for the proposed facility; rezone the area to preserve the remainder of Blount Island; or utilize the remainder of Blount Island for continued fill placement and preserve Back River and its tidally inundated marsh fringes. (Gagliardi-Florida)
W76-00957

MARBLE BLUFF DAM AND PYRAMID LAKE FISHWAY, WASHOE PROJECT, NEVADA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Bureau of Reclamation, Sacramento, Calif. Mid-Pacific Regional Office.
Available from the National Technical Information Service, Springfield, Va 22161 as EIS-NV-73-1585-F, $5.00 in paper copy, $2.25 in microfiche. October 4, 1973, 78 p, 6 fig.

Descriptors: *Dams, *Fisheries, *Erosion, Environmental effects, Nevada, Erosion control, Dam construction, Dam design, Fish, Fish management, Channels, Farms, Hatching, Recreation, Recreation demand.
Identifiers: *Pyramid Lake Indian Reservation, Nevada, *Environmental Impact Statements, Wilderness areas.

The project entails the construction and operation of a dam, fishway and related fish handling facilities near the terminus of the Truckee River in the Pyramid Lake Indian Reservation in Nevada. The dam will reduce river headcutting in the channel area preventing continued and extensive erosion of adjacent farmlands. The project's chief beneficial environmental impact will be the improvement of Pyramid Lake as a fishery and the preservation of Indian agricultural lands and homesites along the lower Truckee River. Construction roads, supporting structures and yards, noise and dust will have temporary adverse effects. Marble Bluff Dam and associated structures will intrude on the level, barren landscape. However, the structures are not large nor unharmonious with the surroundings. Disturbance of the natural setting should therefore be moderate. Improvement of the fishery will bring about increased recreational usage of the lake and adjacent shore areas. Possible alternatives include fishery restoration by hatchery production, a river channel modification in lieu of the proposed dam, and construction at an upstream damsite. Comments have been received from the Departments of Interior, Army, Agriculture, and Commerce among others. (Gagliardi-Florida)
W76-00958

GAS HOUSE COVE (EAST HARBOR FACILITY), SAN FRANCISCO MARINA SMALL CRAFT HARBOR, CALIFORNIA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineers District, San Francisco, Calif.
Available from the National Technical Information Service, Springfield, Va 22161 as EIS-CA-73-1817-F, $4.00 in paper copy, $2.25 in microfiche. November 20, 1973, 41 p, 3 fig.

Descriptors: *Groins(Structures), *Waves(Water), *Breakwaters, *Ocean waves, Boats, Boating, Marinas, Construction, Construction materials, Concrete construction, Concrete structures, Seashores, Oceans.
Identifiers: *Environmental Impact Statements, *San Francisco(Calif).

Gas House Cove is located on the north shore of the City of San Francisco, one and one-half miles east of the Golden Gate Bridge. Along with the West Harbor, Gas House Cove forms what is called the San Francisco Small Boat Harbor. Shortly after it was built it became apparent that it was subject to excessive wave action and resulting damage. This project modifies the facility to reduce wave activity. Implementation will have no adverse ecological effects. The proposed breakwater will serve as a substrata for many marine organisms that are unable to live in bottom mud. During construction precautions will be taken to prevent degradation of water quality. Alternatives considered include construction of a 176 foot concrete breakwater, or no action. (Denvir-Florida)
W76-00959

NAVIGATION OF THE KANSAS RIVER, LAWRENCE TO THE MOUTH (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Kansas City, Mo.
Available from National Technical Information Service, Springfield, Va, 22161, as EIS-KS-73-1560-F, $4.50 in paper copy, $2.25 in microfiche. September 28, 1973. 52 p, 1 map.

Descriptors: *Dredging, *Channels, *Channel improvement, *Channel flow, Low flow, Construction, Maintenance, River flow, River training, Rivers, Benthic fauna, Kansas, Missouri.
Identifiers: *Environmental Impact Statements. *Kansas City(Mo).

The plan consists of a navigation project from the Missouri River to the Turner Bridge on the Kansas River requiring a channel width of 150 feet and a minimum channel depth of 9 feet. Initial construction would include training and bank stabilization work at critical locations, and dredging in some areas to establish a low flow channel. Maintenance dredging would be required on the average of once every two years after project completion. Potential adverse environmental impacts include destruction of benthic organisms in the areas of dredging, disposition of spoil temporarily disrupting fisheries and increased potential for accidental spills associated with commercial navigation. Completion of the project will encourage more rapid industrial development, and improve accessibility to the Kansas River. Alternatives studied included varying lengths of river, construction of a pipeline, increased flow from lakes, dredging only, and regulation by dikes and revetments. (Denvir-Florida)
W76-00960

LAKE BLUFF BEACH EROSION CONTROL, ILLINOIS (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Chicago, Ill.
Available from National Technical Information Service, Springfield Va 22161 as EIS-IL-73-0209-F. December 1972. 113 p, 3 fig, 1 tab.

Descriptors: *Groins(Structures), *Erosion control, *Sands, *Lake Michigan, Illinois, Construction, Steel structures, Beach erosion, Beaches, Piles, Foundations, Littoral drift, Erosion, Erosion rates.
Identifiers: *Environmental Impact Statements, *Lake Bluff Beach, Sunrise Park, Lake County(Ill).

A proposed improvement provides for the construction of two steel sheet piling impermeable groins and the placement of 10,000 cubic yards of sand fill in Lake Michigan on the north side of the southernmost groin. Its purpose is to prevent further erosion and to restore the eroded beach at Sunrise Park in Lake, Bluff, Lake County, Illinois. The improvement will assist in preventing a continued degradation and loss of beach and the bluffs overlooking the lake. The groin will cause a deepening of the beach profile lakewards. To the extent the littoral drift is modified the increased protection will affect the adjacent and downdrift shore. The amount of beach material presently nourishing and maintaining the downdrift shore will be reduced. Alternatives considered consist of supplemental erosion control in conjunction with this plan, or no action. (Denvir-Florida)
W76-00962

ARTIFICIAL ISLANDS: POSSIBILITIES AND LEGAL PROBLEMS,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00965

GREENVILLE HARBOR, MISSISSIPPI (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Vicksburg, Miss.
Available from the National Technical Information Service, Springfield Va 22161 as EIS-MS-73-1477-F. $4.00 in paper copy and $2.25 in microfiche. September 10, 1973. 49 p.

Descriptors: *Harbors, *Channel improvement, *Dredging, Turbidity, Navigation, Environmental effects, Mississippi, Industrial production, Channels, Environmental control, Environment, Economics.
Identifiers: *Environmental impact statement, *Greenville Harbor(Miss).

Recommended Greenville Harbor, Mississippi improvements involve a widening of the channel, construction of an inner harbor channel into the underdeveloped lands adjacent to the existing port area, provision for a general use fleeting area and berthing area in the first reach of the inner harbor channel, and spoilage of the dredged material to provide 390 acres of raised landfill. The harbor and port area expansion would contribute to the economic growth and development of the vicinity. Significant alteration of environmental elements, including land and water areas, would not result from project implementation. However, land and water distrubance during project construction would create unsightly conditions and temporarily intensify turbidity and siltation levels in adjacent waters. Navigation and industrial expansion would also subject the general area to additional sources of pollution. The primary alternatives to project implementation are different sites for harbor expansion, alternative modes of transportation, or no action. (Gagliardi-Florida)
W76-00971

GEORGETOWN CREEK WATERSHED PROJECT, BEAR LAKE COUNTY, IDAHO (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Soil Conservation Service, Boise, Idaho.
Available from the National Technical Information Service, Springfield Va 22161 as EIS-ID-73-0436-F. $4.50 in paper copy and $2.25 in microfiche. February 1973. 68 p, 9 fig, 3 tab.

Descriptors: *Channel improvement, *Irrigation systems, *Watershed management, *Flood protection,Idaho, Flood control, Sediments, Land development, Floods, Erosion, Channels, Irrigation, Environmental effects, Water quality, Water control, Economic impact, Fish, Reservoirs, Water storage, Fisheries.
Identifiers: *Environmental Impact Statements, *Georgetown Creek Watershed, Bear Lake County, Id.

The proposed project entails land treatment measures, channel work, and improvements to the irrigation distribution system of the Georgetown Creek Watershed, Bear Lake County, Idaho. The project will provide waterhsed protection, flood prevention, and facilitation of irrigation. The environmental impact and effects of the project include erosion; floodwater and sediment damage reduction; improvement of water quality; elimination of various health hazards; stimulation of improved economic return; and a temporary loss of fish habitat and a decline of water quality due to construction activities. Alternatives considered include utilization of reservoirs for water storage and control; modification of the proposed works to provide a minimum flow of five cubic feet per second to maintain a fishery between the existing and proposed points of diversion or no action. (Gagliardi-Florida)
W76-00972

HAYS, KANSAS, FLOOD PROTECTION PROJECT (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Kansas City, Mo.
Available from the National Technical Information Service, Springfield Va 22161 as EIS-KS-73-0762-F $4.50 in paper copy and $2.25 in microfiche. November 1972. 63 p, 16 fig, 5 tab.

Descriptors: *Levees, *Channels, *Flood protection, *Flood control, Flood plain zoning, Environmental effects, Habitats, Biota, Kansas, Flood plains, Fisheries.
Identifiers: *Environmental Impact Statements, *Hays(Kan).

The recommended plan consists of new levees, raising of existing levees, and some channel work to provide protection from 76 percent of the standard project flood on Big Creek, Hays, Kansas. The project will provide flood protection to the already existing development in the flood plain, but it will destroy the existing channel and stream habitat to some extent. This includes the loss of associated stream biota that, in large part, supports its existing fishery. The project will also disrupt the existing character of the park. Alternatives to the proposed action include flood plain evacuation and zoning, flood control lake, or no action. Other alternatives considered related to utilization of Lincoln Draw, another channel. (Denvir-Florida)
W76-00973

CHIPOLA NURSERIES, INC. V. DIVISION OF ADMINISTRATION, DEPARTMENT OF TRANSPORTATION (APPEAL OF EMINENT DOMAIN PROCEEDING FOR VIOLATION OF NEPA).
For primary bibliographic entry see Field 6A.
W76-00979

8B. Hydraulics

SHEAR DISTRIBUTION IN BENDS IN RECTANGULAR CHANNELS,
Uttar Pradesh Irrigation Research Inst., Roorkee (India).
D. V. Varshney, and R. J. Garde.
Journal of the Hydraulics Division, Proceedings of American Society of Civil Engineers, Vol 101, No HY8, Paper 11513, p 1053-1066, August 1975. 7 fig, 2 tab, 6 ref, 2 append.

Descriptors: *Open channel flow, *Laboratory tests, *Shear stress, Flumes, Velocity, Reynolds number, Continuity equation, Analysis, Distribution patterns, Hydraulics, Curves, Flow resistance, Roughness(Hydraulic).
Identifiers: *Bends, Secondary flow.

The analysis was based on a forced vortex velocity distribution near the exit of the bend. The constant is the assumed mean velocity distribution was evaluated by use of the continuity equation and by assuming that the entire superelevation had died out at the exit section. The exponent on the radius in the velocity distribution equation was correlated with the bend geometry and the Reynolds number. The mean velocity relationship suggested by Keulegan was assumed to be valid for flow in a bend. Experimental data, collected in a bend in a rectangular flume, were used along with other data to obtain information on the velocity variation. The flume bend had a 60 degree central angle. Three bed roughnesses were used. The bend radius to flume width ratio varied between 1.5 and 6.0. Bed shear stresses were measured in the bend with a preston tube calibrated for each bed roughness. (Adams-ISWS)
W76-00552

OPTIMAL SIZING OF URBAN FLOOD-CONTROL SYSTEMS,
Hydrologic Engineering Center, Davis, Calif. Planning Analysis Branch.
For primary bibliographic entry see Field 4A.
W76-00554

AQUIFER PARAMETER IDENTIFICATION,
California Univ., Los Angeles. Dept. of Engineering Systems.
For primary bibliographic entry see Field 2F.
W76-00650

SCREEN THEORY FOR WELLS AND SOIL DRAINPIPES,
Iowa State Univ., Ames. Dept. of Agronomy.
M. Sami Selim, and D. Kirkham.
Water Resources Research, Vol 10, No 5, p 1019-1030, October, 1974. 19 fig, 3 tab, 19 ref.

Descriptors: *Well screen, *Wells, Theoretical analysis, Hydraulic design, Hydraulic equipment, Hydraulic properties, Irrigation wells.
Identifiers: *Screen theory.

A theoretical solution is given for steady flow in a confined aquifer to a well tube having equally distributed screens. It is shown, quantitatively, by use of Darcy's law and Laplace's equation, that more flow results if a given total length of well screen is utilized in a number of sections over the full length of the well tube than if the given length of well screen is all used at the bottom of the tube. For a pumped well of 0.25-ft radius, 200-ft radius of influence, 50-ft thickness of aquifer, and 25-ft length of screen the use of the screen in five 5-ft-long sections equally distributed over the well tube results in 25% more well flow than if the 25-ft length of screen is all in one piece at the lower 25 ft of the aquifer. The results are presented in tables and graphs having dimensionless parameters so that the flow for a particular flow system may be found in any units. Mathematically, the problem is of the mixed boundary value type. (Skogerboe-Colorado State)
W76-00734

WASTEWATER TREATMENT IN A PRESSURE PIPE,
Irvine Ranch Water District, Calif.
For primary bibliographic entry see Field 5D.
W76-00785

NOMOGRAMS FOR SEARCH OF SYMBOLS PU AND TU OF STORM OVERFLOW IN A MIXING CONDUIT (NOMOGRAMME ZUR EMITTLUNG VON PU UND TU EINES RECENUEBERLAUFS DES MISCHWASSERKANALS),
For primary bibliographic entry see Field 5D.
W76-00793

SEWER OVERFLOW - EVALUATION OF MODEL TEST AND USE IN SEWER TECHNIQUE (REGENUEBERLAEUFE - EINE

AUSWERTUNG VON MODELLVERSUCHEN MIT ANWENDUNG AUF DIE KANALISATIONSTECHNIK),
For primary bibliographic entry see Field 5D.
W76-00794

TECHNICAL, ECONOMIC AND ORGANISATIONAL ASPECTS OF THE EXPLOITATION OF GROUNDWATER RESOURCES,
Gaudalquivir Project, Madrid (Spain).
For primary bibliographic entry see Field 4B.
W76-00811

PIPE SIZE SELECTION FOR COMMUNITY IRRIGATION SYSTEMS,
South Dakota State Univ., Brookings. Dept. of Agricultural Engineering.
For primary bibliographic entry see Field 3F.
W76-00839

ANNUAL REPORT 1974.
New South Wales Univ., Kensington(Australia). Water Research Lab.
For primary bibliographic entry see Field 9C.
W76-00883

JET DISCHARGE INTO A STRATIFIED RESERVOIR,
San Jose State Univ., Calif. Dept. of Mechanical Engineering.
R. B. Darden, J., Imberger, and H. B. Fischer.
Journal of the Hydraulics Division, American Society of Civil Engineers, Vol. 101, No. HY9, Proceedings Paper 11583, p 1211-1220, September 1975. 9 fig, 2 tab, 10 ref, 2 append. NSF GI 34932, EPA 15040 EJZ.

Descriptors: *Jets, *Stratified flow, *Thermal stratification, *Unsteady flow, *Flow profiles, Hydraulics, Reservoirs, Density, Dispersion, Laboratory tests, Circulation, Discharge(Water), Buoyancy.
Identifiers: Streamline patterns.

An experimental investigation of the flow induced by a line jet in a linear-density stratified reservoir fluid was conducted. Both buoyant and non-buoyant jets were discharged into the stratified model and jet discharge and model length were varied. Experimental data indicated the two-dimensional flow field could be divided into three regions: (1) open region above equilibrium level, (2) closed region below equilibrium level, and (3) a central jet with adjacent entrainment rotors. True steady state flow was not achieved. The pattern of induced flow showed no distinctive changes when model length or jet discharge were varied, but the induced flow pattern showed appreciable changes when jet buoyancy was varied from neutral to buoyant. Maximum flow speed, rotor size, and entrainment were significantly increased for the buoyant jet. (Adams - ISWS)
W76-00911

8C. Hydraulic Machinery

STREAM POLLUTION ABATEMENT BY SUPPLEMENTAL PUMPING,
Richmond City Dept. of Public Utilities.
For primary bibliographic entry see Field 5D.
W76-00509

THE SELECTION AND APPLICATION OF SLURRY PUMPS,
E. L. Arnold.
Pumps and Their Applications, The International Technical Review, No 105, p 763-967, June, 1975. 10 fig.

Descriptors: *Slurries, *Centrifugation, *Pumps, *Design criteria, Hydraulic engineering, Liquids, Construction materials, Waste water treatment.
Identifiers: Slurry pumps.

Basic facts concerning when to specify a slurry rated pump, which type of pump to use, and proper application of such pumps are reviewed. The centrifugal slurry pump may be used for municipal sewage, industrial wastes, and evaporator-crystalizer fluids, and should be considered when the fluid to be pumped contains more solids than are found in potable water. Choice of pump should be initially based on the liquids to be pumped in terms of physical and chemical characteristics. Other influences on the choice of pump include required heads and capacities, plant layout considerations, and economic requirements. Basic pump material is usually cast iron, sometimes reinforced with 3% nickel for corrosion protection. Also, materials such as rubber linings may be used for pump protection. The main working basis for pump selection is the System Curve. This is illustrated by several graphs and represents a plot of the head which must be met by the pump at any given series of capacity points, as determined by the piping. Thus, once the static nature of the slurry is known, and the plant requirements and manufacturer's specifications are stated, one can choose a slurry pump that meets design requirements and has performance curves, which when laid on the System Curve form an intersection at a point low enough to minimize wear. (Kramer-FIRL)
W76-00565

SWITCHING VALVE FOR CONTINUOUS FILTERING DEVICES,
Agfa-Gevaert, Mortsel (Belgium).
M. L. Beuselinck.
United States Patent 3,896,029. Issued July 22, 1975. Official Gazette of the United States Patent Office, Vol 936, No 4, p 1385-1386, July, 1975. 1 fig.

Descriptors: *Patents, *Flow, Liquids, Equipment, *Valves, Filtration, Water treatment, Waste water treatment, Conduits.

A flow control unit has been patented which selectively controls fluid flow from a common inlet conduit through two loop-shaped flow paths into a common outlet conduit. Each loop-shaped flow path includes a filtration unit. Control is achieved by a valve which has a supply inlet port connected to the inlet conduit and two loop inlet ports arranged in an angularly spaced relation about the axis of the valve housing. Part of the valve rotates within its housing and is in continuous communication with the common inlet conduit. Thus a wall is defined, larger in angular extent than either of the loop inlet ports, so that by rotating the valve either of the ports can be exclusively used to feed the flow of liquids. Flow may be through each loop discharge port alternatively or through both together. (Kramer-FIRL)
W76-00586

RECENT TRENDS OF INSTRUMENTATION, CONTROL, AND AUTOMATION SYSTEMS FOR WASTEWATER TREATMENT SYSTEMS (GESUIDO SHISUTEMU SEIGYO NO DOKO),
For primary bibliographic entry see Field 5D.
W76-00604

SPECIFICATIONS FOR GRANULAR FILTER MEDIA,
University Coll., London (England).
For primary bibliographic entry see Field 5D.
W76-00622

A HISTORY OF SEWAGE WORKS' MACHINERY,
For primary bibliographic entry see Field 5D.
W76-00639

PORT HURON FRESH WATER TUNNEL.
Tunnels and Tunnelling, Vol 4, No 4, p 317, July, 1972. 1 fig.

Descriptors: *Tunnels, *Tunneling, Tunnel construction, Equipment, Michigan.
Identifiers: Detroit(Mich), Tunneler.

The Detroit Metropolitan Water Department's Port Huron tunnel, an 18.3-foot diameter bored tunnel with a foot-thick concrete lining, is scheduled to carry 1.2 billion gallons of water per day. In this project, the hardrock tunneler, designed and manufactured by the Lawrence Division of Ingersoll-Rand Company, Seattle, Washington, bored a record 2060 cubic yards of shale in 19 hours. The 175-ton machine held a steady heading as exemplified by the bored tunnel being within 3.5 inches of true line and grade over the full length of the tunnel. This accuracy was attributed to the tunneler's pilot anchor located immediately behind a pilot drill which extends 10.5 feet ahead of the cutterhead and rotates at approximately 60 rpm while the cutterhead rotated at 7.2 rpm. Working with the pilot anchor, which is attached to a shaft running the full length of the tunneler thus forming the basic structural member of the machine, are rib jacks which thrust up to 1.5 million pounds pressure against the tunnel wall. (Sandoski-FIRL)
W76-00768

SURFACE SCUM EXTRACTOR-FOR RECTANGULAR FLOTATION TANK IN SEWAGE WORKS.
For primary bibliographic entry see Field 5D.
W76-00845

8D. Soil Mechanics

THE EFFECT OF FINITE CHANNEL WIDTH ON CONCENTRATION POLARISATION REVERSE OSMOSIS UNDER LAMINAR FLOW CONDITIONS,
Birmingham Univ. (England). Dept. of Chemical Engineering.
For primary bibliographic entry see Field 3A.
W76-00642

SMALL TENSIOMETERS FOR FIELD AND LABORATORY STUDIES,
Agricultural Research Service, Gainesville, Fla.
For primary bibliographic entry see Field 2G.
W76-00733

POWDERED METAL PLATES FOR CONSTRUCTING UNSATURATED FLOW CELLS,
Agricultureal Research Service, Fresno, Calif. Water Management Research.
For primary bibliographic entry see Field 2G.
W76-00840

8E. Rock Mechanics and Geology

MOLE MUNCHES THROUGH 4 MILES OF HARD ROCK.
For primary bibliographic entry see Field 5D.
W76-00779

TUNNELLING METHOD BREAKS NEW GROUND.
For primary bibliographic entry see Field 8G.
W76-00781

8G. Materials

COMPRESSIBILITY CHARACTERISTICS OF UNDISTURBED SNOW,
Cold Regions Research and Engineering Lab. Hanover, N.H.
For primary bibliographic entry see Field 2C.
W76-00537

CORROSION CONTROL BY CATHODIC PROTECTION,
For primary bibliographic entry see Field 5D.
W76-00619

THE FLOATING COVER: BEST WAY TO COVER A FINISHED-WATER RESERVOIR.
For primary bibliographic entry see Field 5F.
W76-00624

OPERATION OF SEWER AND DRAINAGE SYSTEMS (BETRIEB VON KANALISATIONS- UND ENTWAESSERUNGSANLAGEN),
For primary bibliographic entry see Field 5D.
W76-00626

LINING OF STORAGE RESERVOIRS AND LAGOONS--THE LATEST TECHNIQUES IN INSTALLATION AND JOINTING,
J. Coulson.
Water Services, Vol 79, No 952, p 235-237, June, 1975. 4 fig, 2 tab.

Descriptors: *Synthetic rubber, Reservoirs, *Lagoons, Installation, *Joints(Connections), Construction materials, *Linings.
Identifiers: *Jointing, Butyl, EPDM, Hypalon, Reservoir linings.

Synthetic rubber membranes for lining permanent reservoirs and lagoons have been used recently. Three different rubber materials which can be efficiently jointed and installed are Butyl, Hypalon, and EPDM. All three must have been manufactured to correct specifications; must have been satisfactorily fabricated into large sheet sizes under factory-controlled conditions, using correct jointing techniques for their particular product; and must have installation and site jointing carried out by skilled and fully trained operators. Butyl and EPDM are discussed in detail; in terms of weathering, chemical properties, permeability, and mechanical resistance, these materials are strong and long-lasting. In order to construct a structurally sound reservoir, however, it is necessary to follow recommendations for the embankment and reservoir base. The substrate must be smooth; efficient under-drainage systems must have been built before addition of the membrane; and precautionary measures must be taken if any possibility of natural gas leakage exists. Both Butyl and EPDM are factory-made in sheets and vulcanized together by the use of heat pressure and an uncured tape which is placed between the sheets before heat and pressure are applied. Sheets may be jointed on site, and must be properly anchored into a reservoir. Hypalon may be supported or unsupported and is used in a scrim-supported form to waterproof lagoons or reservoirs. Hypalon is the least affected by ozone or by ultraviolet light. (Kramer-FIRL)
W76-00632

JAPANESE LOADING TESTS ON BERNOLD LINING SYSTEM.
Tunnels and Tunnelling, Vol 4, No 4, p 320, July, 1972. 3 fig.

Descriptors: Tunnels, Testing, Strength of materials, Construction materials, Construction joints.
Identifiers: Japan, Bearing capacity, Bernold sheets.

Loading tests to determine the influence of Bernold sheets on the bearing behavior of thin semi-stiff tunnel vaults with large spans have been conducted in Japan. The test piece is a concrete arch section 25 cm thick by 8 meters in length and reinforced by 2 mm-thick Bernold sheets. Under a distributed load of 2.7 tons/cubic meter, no cracks larger than .05 mm were determined. This compared with a broad flanged girder which ruptured under a load smaller than 20 tons/square meter. Results confirm that Bernold sheets have a very high bearing capacity and their joints do not cause any weakness in the structure. Sandoski-FIRL)
W76-00767

32-FOOT VERTICAL SHAFT BUILT WITH CONCRETE PIPE.
The American City, Vol 87, No 12, p 28, December, 1972. 2 fig.

Descriptors: Concrete pipes, Construction, Pipes, Sewers, Waste water treatment.

To avoid blocking a busy intersection, a vertical shaft and 75 feet of tunneling were used to connect two sewers with a 32-foot differential in elevation. The vertical shaft consisted of 36-inch concrete pressure pipes with tees at the upper and lower end. A special reducer connects the 36-inch pipe to the 48-inch tee at the lower end. This tee at the base of the shaft permits a slight buildup of water that serves as a liquid cushion at the bottom of the 32-foot drop. An eight-inch riser pipe connected to the vertical shaft at the ends and third point eliminates the possibility of a vacuum developing. The top of the shaft, capped with a concrete bulkhead plug, can be reached by means of a manhole extending to the street surface. (Sandoski-FIRL)
W76-00776

TUNNELLING METHOD BREAKS NEW GROUND.
Surveyor, Vol 140, No 4189, p 27, September 22, 1972. 2 fig.

Descriptors: *Tunneling, *Tunneling machines, *Tunnels, Soils, Sewers, Water supply, Safety, Costs, Bentonite.

A new method and equipment for tunneling difficult sand and gravel includes the introduction of bentonite to the basic method used in tunneling through soft ground with an excavator shield. The use of the new machine and technique eliminates or reduces the use of compressed air, which can cause bone necrosis in tunnel miners, and also reduces the risk of subsidence. With the tunneling machine, similar to other excavator shields designed for soft tunneling, the cutters revolve in a sealed chamber which is filled with a thixotropic slurry of bentonite clay under pressure. Bentonite holds up the tunnel face, sinking into the gravel for some inches and forming a skin to seal it. One tunnel ring at a time is built up from cast iron segments in the tail of the machine and the machine pushes itself forward by jacking against the completed ring. The development of this method will considerably reduce tunneling costs and also have an important of the building of underground railways as well as becoming applicable to tunnels for sewers, water supply, or electric cables. Tunnels can be constructed at relatively shallow depths below buildings or roads without danger according to present experience with the application of this technique. (Sandoski-FRIL)
W76-00781

OAKLAND MAPS PROGRAM TO COMBAT SEWER INFILTRATION,
California State Dept. of Public Works, Oakland.
For primary bibliographic entry see Field 5D.
W76-00792

SEWERAGE DRAINS MADE OF PLASTIC PIPES (KANALISATION MIT KUNSTSTOFROHREN),.
For primary bibliographic entry see Field 5D.
W76-00797

A LABORATORY TEST OF SOME DRAIN TUBE FILTER MATERIALS,
McGill Univ., Montreal (Quebec).
E. McKyes, and R. S. Broughton.
Canadian Agricultural Engineering, Vol 16, No 2, p 60-62, December, 1974. 5 fig, 6 ref.

Descriptors: *Drainage, *Drainage effects, *Drainage engineering, *Drainage practices, Filtration, Drains, Materials testing.

Drainage systems frequently fail in fine sandy soils because of particles entering drain tiles in sufficient quantity to block the drains. Attempts have been made to employ filters outside tiles to allow only soil-free water to enter the system. Some commercially available or promising filters for corrugated plastic drain tubes were tested and their effect on water and soil entry into tubes over approximately 2 mo of continuous operation was assessed. Compared with unfiltered tubes, those with polyester weave stocking filters and fiberglass showed very little soil entry and a good continued waterflow. (Skogerboe-Colorado State)
W76-00832

PIPELINE PIG OR SWIPE,
H. J. Girard.
Canadian Patent 994,109. Issued March 26, 1974. Patents/Brevets, Vol 102, No 13, p 1062, March 26, 1974.

Descriptors: *Patents, *Pipes, *Sewers, *Cleaning, Pipelines, Plastics.
Identifiers: Swipes, Pigs(Devices).

A patent has been issued for a pig or swipe for use in cleaning pipe lines and for maintaining fluids separated while being transmitted through the line. It is adapted to be propelled through the line by a pressure gradient. The pig includes a sponge-like body of foamed plastic material, having an external coating of durable material (unfoamed plastic) in which reenforcing material (wire mesh or glass fabric) may be embedded to increase resistance to wear. The covering is applied to leave openings through which the sponge-like body may project into wiping contact with the surroundings internal surface of the pipe. The pig also has a barrier layer at one end positioned to close the sponge-like body against the passage of fluid, and to form a fluid tight seal with the surrounding pipe. The invention includes a method and apparatus for making the pigs or swipes. (Murphy-FIRL)
W76-00848

LAKE BLUFF BEACH EROSION CONTROL, ILLINOIS (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Chicago, Ill.
For primary bibliographic entry see Field 8A.
W76-00962

8H. Rapid Excavation

PORT HURON FRESH WATER TUNNEL.
For primary bibliographic entry see Field 8C.
W76-00768

MINI TUNNELLING SYSTEM.
Gas World, Vol 176, No 4599, p 309, October 14, 1972. 3 fig.

Descriptors: *Tunnels, *Tunneling machines, Trenches, Pipes, Tunnel construction, Soil pressure.

The Mini Tunnel is a complete fully integrated segment built tunneling system replacing sewer trenching in urban areas and accommodating pipes up to 48 inches in diameter. Using thin shell segments, built-in stress inducers keep the structure in compression to tolerate variable soil pressures. Aerohydraulics are used to move the shield through the ground as 120 degree concrete segments are built in the shield tail. Differential pressure steering produces accurate alignment control. The system is competitive with open trench sewer laying at shallow depths. The whole package, including a two-ton crane to handle materials, a tool compressor to drive the shield and gravel injector, and a Mini Mule for underground transportation, with a total weight of six tons, economizes on site-to-site haulage. (Sandoski-FIRL)
W76-00782

PERMIT APPLICATION BY RADCLIFF MATERIALS, INC. DREDGING OF DEAD-REEF SHELLS, MOBILE BAY, ALABAMA (FINAL ENVIRONMENTAL IMPACT STATEMENT).
Army Engineer District, Mobile, Ala.
February 1973. 198 p, 3 tab, 1 map.

Descriptors: *Dredging, *Oysters, *Bays, *Benthic fauna, Turbidity, Ecosystems, Environmental Effects, Alternative planning, Photosynthesis, Mud, Alabama.
Identifiers: *Environmental Impact Statement, *Mobile(Ala).

The project consists of dredging oyster shell from four areas within the confines of Mobile Bay, Alabama. The shell dredge will resuspend materials present in the bay bottom which have been isolated from the day-to-day bay ecosystem for a long period of time. Benthic organisms will be destroyed by the cutting of the dredge and smothered by the mud flow. Turbidity caused by the dredging will reduce photosynthesis slowing the repopulation of benthic organisms. Some dredging of small amounts of live oysters is unavoidable. There are three alternatives to the approval of the permit application: denial of the permit, issuance of the permit with conditions of non-renewal at its expiration, or issuance of the permit with restrictions. (Denvir-Florida)
W76-00961

8I. Fisheries Engineering

ACQUISITION AND CULTURE OF RESEARCH FISH: RAINBOW TROUT, FATHEAD MINNOWS, CHANNEL CATFISH, AND BLUEGILLS,
Bureau of Sport Fisheries and Wildlife, Columbia, Mo. Fish-Pesticide Research Lab.
For primary bibliographic entry see Field 5G.
W76-00680

ARTIFICIAL ISLANDS: POSSIBILITIES AND LEGAL PROBLEMS,
North Carolina State Univ., Raleigh.
For primary bibliographic entry see Field 6E.
W76-00965

9. MANPOWER, GRANTS AND FACILITIES

9C. Research Facilities

NERC 74, ANNUAL REPORT.
National Environmental Research Center, Cincinnati, Ohio.
For primary bibliographic entry see Field 5G.
W76-00879

ANNUAL REPORT 1974.
New South Wales Univ., Kensington(Australia). Water Research Lab.
Water Research Laboratory, 1974. 9 p, 2 fig.

Descriptors: *Research and development, *Investigations, *Water resources, *Engineering, *Australia, Hydraulics, Model studies, Mathematical models, Computer models, On-site investigations, Surveys, Calibrations, Hydraulic engineering, Design, Planning, Groundwater, Estuaries, Coasts, Flow.

The Water Research Laboratory (WRL) is a section of the School of Civil Engineering of the University of New South Wales. Specializing in research, design, and investigation of water engineering problems, it is active in the areas of graduate instruction in hydraulics and water resources; basic research of water engineering problems; design, planning, and investigation of water engineering projects; co-ordination of multi-discipline projects in the development of water resources; hydraulic model studies; computer analysis and mathematical models; field surveys; calibration and testing of pumps and meters; and library services. During the 1974 basic research studies were undertaken in the fields of groundwater, coastal and estuarine hydraulics, multi-density flow, water resources, water supply, and open channel hydraulics. Brief descriptions of 57 research projects were given. (Robinson-ISWS)
W76-00883

9D. Grants, Contracts, and Research Act Allotments

NERC 74, ANNUAL REPORT.
National Environmental Research Center, Cincinnati, Ohio.
For primary bibliographic entry see Field 5G.
W76-00879

10. SCIENTIFIC AND TECHNICAL INFORMATION

10C. Secondary Publication And Distribution

BIBLIOGRAPHY OF HYDROLOGY, CANADA, 1971-1973.
International Association of Hydrological Sciences, Ottawa (Ontario).
Department of the Environment, Ottawa, Ontario (Canada), Inland Waters Directorate.410 p.

Descriptors: *Hydroiogy, *Bibliographies, *Canada, Meteorology, Surface waters, Rivers, Lakes, Snow, Sedimentation, Groundwater, Soil moisture, Water quality, Water pollution, Data collections, Reviews, Information retrieval.

A bibliography of information relating to hydrology in Canada was compiled. References were listed in the areas of general hydrology, hydrometeorology, surface water, subsurface waste, bio-hydrology, forest hydrology, water quality, and pollution. An author index was provided. (Robinson-ISWS)
W76-00532

HYDROLOGY AND WATER RESOURCES, A SYLLABUS OF REFERENCES FOR TEACHING INTRODUCTORY COURSES IN THE WATER ENVIRONMENT.
National Committee for the International Hydrological Decade, Washington, D.C.
Available from the National Technical Information Service Springfield, Va 22161 as PB-238-071. National Academy of Sciences-National Research Council, Washington, D.C., August 1972. 73 p. NSF-C-310.

Descriptors: *Education, *Bibliographies, *Publications, *Hydrology, *Water resources, Water, Water properties, Hydrologic cycle, Atmosphere, Groundwater, Soil moisture, Runoff, Watersheds(Basins), Streamflow, Water utilization, Floods, Wetlands, Water pollution, Planning, Management, Decision making, Remote sensing, Technology, Research and development.
Identifiers: Syllabus.

This syllabus provides a detailed guide to organizing courses in general hydrology and the water resources fields and offers a large number of references. Reflecting the current concern for both the science and management of water, it includes references to physical aspects of water and to economic, political, and social stresses imposed on that physical system by the complex demands for water in the United States. The syllabus is outlined in sufficient detail to be capable of being used as a basis for a wide variety of instructional needs, ranging from a 2-hour lecture series to full-semester introductory courses in hydrology and in water resources problems. The syllabus is in the form of an annotated topical outline. Each chapter is subdivided to provide increasingly detailed information. An instructor should find an adequate selection of basic introductory material for his needs. The bibliography of references includes 134 sources. (Robinson-ISWS)
W76-00536

EVAPOTRANSPIRATION,
Forest Service (USDA), Durham, N.H. Northeastern Forest Experiment Station.
For primary bibliographic entry see Field 02D.
W76-00702

10D. Specialized Information Center Services

STORM WATER MANAGEMENT MODEL: DISSEMINATION AND USER ASSISTANCE,
University City Science Center, Philadelphia, Pa.
For primary bibliographic entry see Field 05G.
W76-00678

10F. Preparation Of Reviews

OTTAWA PLAYS KEY ROLE IN TECHNOLOGY TRANSFER,
Environmental Protection Service, Ottawa, (Ontario).
For primary bibliographic entry see Field 05D.
W76-00643

SCIENTIFIC AND TECHNICAL ASSESSMENT REPORT ON PARTICULATE POLYCYCLIC ORGANIC MATTER.
Environmental Protection Agency, Research Triangle Park, N. C.
For primary bibliographic entry see Field 05A.
W76-00682

SUBJECT INDEX

1973 INTERNATIONAL CONVENTION FOR THE PREVENTION OF POLLUTION FROM SHIPS
No Dumping in This Ocean: Nearing the End of Ship-Generated Pollution,
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W76-00645 5D

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W76-00693 5D

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W76-00851 5D

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W76-00858 5D

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W76-00508 5D

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W76-00618 5F

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W76-00623 5G

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